

5/15/03

S7  
3.5

FILED ENTERED  
LODGED RECEIVED

★ MAY 22 2003 ★

AT SEATTLE  
CLERK U.S. DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON  
BY DEPUTY

IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF WASHINGTON  
SEATTLE DIVISION

UNITED STATES OF AMERICA

Plaintiff,

v.

TODD PACIFIC SHIPYARDS  
CORPORATION,

Defendant .

CIVIL ACTION NO.

TSSOU RA CONSENT DECREE

**CV03 1179**

USEPA SF



1163051

## TABLE OF CONTENTS

1			
2	I.	BACKGROUND .....	1
3	II.	JURISDICTION .....	3
4	III.	PARTIES BOUND .....	3
5	IV.	DEFINITIONS .....	4
6	V.	GENERAL PROVISIONS .....	8
7	VI.	PERFORMANCE OF THE WORK BY SETTLING DEFENDANT .....	9
8	VII.	REMEDY REVIEW .....	13
9	VIII.	QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS .....	14
10	IX.	ACCESS AND INSTITUTIONAL CONTROLS .....	16
11	X.	REPORTING REQUIREMENTS .....	19
12	XI.	EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS .....	21
13	XII.	PROJECT COORDINATORS .....	23
14	XIII.	ASSURANCE OF ABILITY TO COMPLETE WORK .....	24
15	XIV.	CERTIFICATION OF COMPLETION .....	25
16	XV.	EMERGENCY RESPONSE .....	27
17	XVI.	PAYMENTS FOR RESPONSE COSTS .....	28
18	XVII.	INDEMNIFICATION AND INSURANCE .....	30
19	XVIII.	FORCE MAJEURE .....	32
20	XIX.	DISPUTE RESOLUTION .....	34
21	XX.	STIPULATED PENALTIES .....	37
22	XXI.	COVENANTS NOT TO SUE BY PLAINTIFF .....	40
23	XXII.	COVENANTS BY SETTLING DEFENDANT .....	44
24	XXIII.	EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION .....	46
25	XXIV.	ACCESS TO INFORMATION .....	47
26	XXV.	RETENTION OF RECORDS .....	48
27	XXVI.	NOTICES AND SUBMISSIONS .....	49
28	XXVII.	EFFECTIVE DATE .....	50
	XXVIII.	RETENTION OF JURISDICTION .....	50
	XXIX.	APPENDICES .....	51
	XXX.	COMMUNITY RELATIONS .....	51
	XXXI.	MODIFICATION .....	51
	XXXII.	LODGING AND OPPORTUNITY FOR PUBLIC COMMENT .....	52
	XXXIII.	SIGNATORIES/SERVICE .....	52
	XXXIV.	FINAL JUDGMENT .....	53

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks, inter alia: (1) reimbursement of costs incurred by EPA and the Department of Justice for response actions at the Todd Shipyard Sediment Operable Unit ("TSSOU") of the Harbor Island Superfund Site ("Site") in Seattle, Washington, together with accrued interest; and (2) performance of studies and response work by the defendants at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of Washington (the "State") on July 18, 2002, of negotiations with potentially responsible parties regarding the implementation of the remedial action for the TSSOU, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the Washington State Department of Ecology, Washington State Department of Natural Resources, U.S. National Oceanographic and Atmospheric Administration, the U.S. Department of Fish and Wildlife, the Muckleshoot Indian Tribe and the Suquamish Indian Tribe, July 18, 2002, of negotiations with potentially responsible parties regarding the release of hazardous substances that may have resulted in injury to the natural resources under Federal trusteeship and encouraged the trustees to participate in the negotiation of this Consent Decree.

E. The defendant that has entered into this Consent Decree ("Settling Defendant") does not admit any liability to the Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor does it acknowledge that the release or threatened release of hazardous substances at or from the

1 TSSOU constitutes an imminent or substantial endangerment to the public health or welfare or the  
2 environment.

3 F. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the  
4 National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal  
5 Register on September 8, 1983, 48 Fed. Reg. 40658.

6  
7 G. In response to a release or a substantial threat of a release of hazardous substances at or  
8 from the Site, EPA commenced a Remedial Investigation and Feasibility Study ("RI/FS") for the Site  
9 pursuant to 40 C.F.R. § 300.430, which was completed in 1996.

10 H. Settling Defendant and other PRPs at the Site completed a Supplementary Remedial  
11 Investigation ("SRI") Report on August 29, 1996, related to sediment portions of the Site.

12  
13 I. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the  
14 completion of the FS and of the proposed plan for remedial action in a major local newspaper of general  
15 circulation. EPA provided an opportunity for written and oral comments from the public on the  
16 proposed plan for remedial action for the former Shipyard Sediment Operable Unit ("SSOU") of the Site.  
17 A copy of the transcript of the public meeting is available to the public as part of the administrative  
18 record upon which the Regional Administrator based the selection of the response action.

19 J. The decision by EPA on the remedial action to be implemented at the former SSOU is  
20 embodied in a final Record of Decision ("ROD"), issued on November 27, 1996, on which the State  
21 concurred. The ROD includes a responsiveness summary to the public comments. Notice of the final  
22 plan was published in accordance with Section 117(b) of CERCLA.

23  
24 K. EPA issued an Explanation of Significant Differences ("ESD") for the TSSOU on  
25 December 27, 1999, after the SSOU was divided into two operable units including the TSSOU. EPA  
26 issued a second ESD on March 31, 2003. All references to the ROD in this Consent Decree include both  
27 ESDs.

1 L. Pursuant to two Administrative Orders on Consent ("AOC") for Remedial Design issued  
2 in July 1997 and April 2000, respectively, the Settling Defendant completed a Phase 1 Remedial Design  
3 Sampling and Analysis Results Report and a Phase 2 Remedial Design Sampling and Analysis Report  
4 on January 11, 1999 and August 10, 2001, respectively.

5 M. Based on the information presently available to EPA, EPA believes that the Work will  
6 be properly and promptly conducted by the Settling Defendant if conducted in accordance with the  
7 requirements of this Consent Decree and its appendices.

8  
9 N. Solely for the purposes of Section 113(j) of CERCLA, the Remedial Action selected by  
10 the ROD and the Work to be performed by the Settling Defendant shall constitute a response action  
11 taken or ordered by the President.

12 O. The Parties recognize, and the Court by entering this Consent Decree finds, that this  
13 Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent  
14 Decree will expedite the cleanup of the TSSOU and will avoid prolonged and complicated litigation  
15 between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.  
16

17 NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

18 II. JURISDICTION  
19

20 1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C.  
21 §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction  
22 over the Settling Defendant. Solely for the purposes of this Consent Decree and the underlying  
23 complaint, Settling Defendant waives all objections and defenses it may have to jurisdiction of the Court  
24 or to venue in this District. Settling Defendant shall not challenge the terms of this Consent Decree or  
25 this Court's jurisdiction to enter and enforce this Consent Decree.

26 III. PARTIES BOUND  
27

28 2. This Consent Decree applies to and is binding upon the United States and upon Settling

1 Defendant and its successors and assigns. Any change in ownership or corporate status of Settling  
2 Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no  
3 way alter Settling Defendant's responsibilities under this Consent Decree. Settling Defendant shall  
4 provide a copy of this Consent Decree to each contractor hired to perform the Work (as defined below)  
5 required by this Consent Decree and to each person representing Settling Defendant with respect to the  
6 TSSOU or the Work and shall condition all contracts for performance of the Work, entered into  
7 hereunder upon performance of the Work in conformity with the terms of this Consent Decree. Settling  
8 Defendant or its contractors shall provide written notice of the Consent Decree to all subcontractors  
9 hired to perform any portion of the Work required by this Consent Decree. Settling Defendant shall  
10 nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work  
11 contemplated herein in accordance with this Consent Decree. With regard to the activities undertaken  
12 pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual  
13 relationship with Settling Defendant within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C.  
14 § 9607(b)(3).

#### 15 IV. DEFINITIONS

16  
17 3. Unless otherwise expressly provided herein, terms used in this Consent Decree which are  
18 defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to  
19 them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree  
20 or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

21 "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and  
22 Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, et seq.

23  
24 "Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section  
25 XXIX). In the event of conflict between this Decree and any appendix, this Decree shall control.

26 "Day" shall mean a calendar day unless expressly stated to be a working day. "Working day"  
27 shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time  
28

1 under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal holiday, the  
2 period shall run until the close of business of the next working day.

3 "Effective Date" shall be the effective date of this Consent Decree as provided in Paragraph 102.

4  
5 "EPA" shall mean the United States Environmental Protection Agency and any successor  
6 departments or agencies of the United States.

7 "Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect  
8 costs not inconsistent with the NCP, that the United States incurs in reviewing or developing plans,  
9 reports and other items pursuant to this Consent Decree, verifying the Work, or otherwise implementing,  
10 overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor  
11 costs, travel costs, laboratory costs, the costs incurred pursuant to Sections VII, IX (including, but not  
12 limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement  
13 institutional controls including, but not limited to, the amount of just compensation), XV, and Section  
14 XXI. Future Response Costs shall also include all Interim Response Costs, and all Interest on those Past  
15 Response Costs Settling Defendant has agreed to reimburse under this Consent Decree that has accrued  
16 pursuant to 42 U.S.C. § 9607(a) during the period from January 1, 2002 to the date of entry of this  
17 Consent Decree.

18  
19 "Interim Response Costs" shall mean all costs not inconsistent with the NCP, including direct  
20 and indirect costs, (a) paid by the United States in connection with the TSSOU between January 1, 2002  
21 and the Effective Date, or (b) incurred prior to the Effective Date but paid after that date.

22 "Interest," shall mean interest at the rate specified for interest on investments of the EPA  
23 Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1  
24 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate  
25 in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each  
26 year.

27  
28 "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances

1 Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605,  
2 codified at 40 C.F.R. Part 300, and any amendments thereto.

3 "Operation and Maintenance" or "O & M" shall mean all activities required to maintain the  
4 effectiveness of the Remedial Action as required under the Operation and Maintenance Plan approved  
5 or developed by EPA pursuant to this Consent Decree and the Statement of Work ("SOW").

6  
7 "Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral or an  
8 upper case letter.

9 "Parties" shall mean the United States and the Settling Defendant.

10  
11 "Past Response Costs" shall mean all costs not inconsistent with the NCP, including, but not  
12 limited to, direct and indirect costs, that the United States paid at or in connection with the TSSOU  
13 through December 31, 2001, and all such costs which have accrued pursuant to 42 U.S.C. § 9607(a)  
14 through such date.

15 "Performance Standards" shall mean the cleanup standards and other measures of achievement  
16 of the goals of the Remedial Action, set forth in Sections H and K of the ROD and Sections II and III  
17 of the SOW and any modified standards established by EPA pursuant to the "technical impracticability"  
18 provision of Paragraph 11.

19  
20 "Plaintiff" shall mean the United States.

21 "RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq. (also  
22 known as the Resource Conservation and Recovery Act).

23  
24 "Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the Shipyard  
25 Sediment Operable Unit, Harbor Island Superfund Site issued on November 27, 1996, by the Regional  
26 Administrator, EPA Region X, and all attachments thereto, including both ESDs. The ROD is attached  
27 as Appendix B.

1 "Remedial Action" shall mean those activities, except for Operation and Maintenance, to be  
2 undertaken by the Settling Defendant to implement the ROD, in accordance with the SOW and the final  
3 Remedial Design and Remedial Action Work Plans and other plans approved by EPA.

4 "Remedial Action Work Plan" shall mean the document developed pursuant to Paragraph 9 of  
5 this Consent Decree and approved by EPA, and any amendments thereto.

6  
7 "Remedial Design" shall mean those activities undertaken by the Settling Defendant to develop  
8 the final plans and specifications for the Remedial Action pursuant to the Remedial Design Work Plan.

9 "Section" shall mean a portion of this Consent Decree identified by a Roman numeral.

10  
11 "Settling Defendant" shall mean Todd Pacific Shipyards Corporation.

12 "Site" shall mean the Harbor Island Superfund Site. The Todd Shipyard Sediment Operable Unit  
13 ("TSSOU") of the Harbor Island Superfund Site encompasses approximately 34 acres, is located  
14 adjacent to Todd Pacific Shipyards Corporation at 1801 16th Avenue S.W. in Seattle, King County,  
15 Washington, and is depicted generally on the map attached as Appendix C.

16  
17 "Statement of Work" or "SOW" shall mean the statement of work for implementation of the  
18 Remedial Action, and Operation and Maintenance at the TSSOU, as set forth in Appendix A to this  
19 Consent Decree and any modifications made in accordance with this Consent Decree.

20 "Supervising Contractor" shall mean the principal contractor retained by the Settling Defendant  
21 to supervise and direct the implementation of the Work under this Consent Decree.

22  
23 "Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA,  
24 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33);  
25 and (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27).

26 "Work" shall mean all activities Settling Defendant is required to perform under this Consent  
27 Decree, except those required by Section XXV (Retention of Records).

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

V. GENERAL PROVISIONS

4. Objectives of the Parties. The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment at the TSSOU by the implementation of response actions at the TSSOU by the Settling Defendant, to reimburse response costs of the Plaintiff, and to resolve the claims of Plaintiff against Settling Defendant as provided in this Consent Decree.

5. Commitments by Settling Defendant. Settling Defendant shall finance and perform the Work in accordance with this Consent Decree, the ROD, the SOW, and all work plans and other plans, standards, specifications, and schedules set forth herein or developed by Settling Defendant and approved by EPA pursuant to this Consent Decree. Settling Defendant shall also reimburse the United States for Past, Interim and Future Response Costs as provided in this Consent Decree.

6. Compliance With Applicable Law. All activities undertaken by Settling Defendant pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendant must also comply with all applicable or relevant and appropriate requirements of all Federal and state environmental laws as set forth in the ROD and the SOW. The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be considered to be consistent with the NCP.

7. Permits.

a. As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work). Where any portion of the Work that is not on-site requires a federal or state permit or approval, Settling Defendant shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. Settling Defendant may seek relief under the provisions of Section XVIII (Force Majeure) of this Consent Decree for any delay in the performance of the Work resulting from a failure

1 to obtain, or a delay in obtaining, any permit required for the Work.

2 c. This Consent Decree is not, and shall not be construed to be, a permit issued  
3 pursuant to any federal or state statute or regulation.

4  
5 VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANT

6 8. Selection of Supervising Contractor.

7  
8 a. All aspects of the Work to be performed by Settling Defendant pursuant to  
9 Sections VI (Performance of the Work by Settling Defendant), VII (Remedy Review), VIII (Quality  
10 Assurance, Sampling and Data Analysis), and XV (Emergency Response) of this Consent Decree shall  
11 be under the direction and supervision of the Supervising Contractor, the selection of which shall be  
12 subject to disapproval by EPA. Within 10 days after the lodging of this Consent Decree, Settling  
13 Defendant shall notify EPA in writing of the name, title, and qualifications of any contractor proposed  
14 to be the Supervising Contractor. With respect to any contractor proposed to be Supervising Contractor,  
15 Settling Defendant shall demonstrate that the proposed contractor has a quality system that complies  
16 with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data  
17 Collection and Environmental Technology Programs," (American National Standard, January 5, 1995),  
18 by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should  
19 be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)"  
20 (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA will issue  
21 a notice of disapproval or an authorization to proceed. If at any time thereafter, Settling Defendant  
22 proposes to change a Supervising Contractor, Settling Defendant shall give such notice to EPA and must  
23 obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs,  
24 or supervises any Work under this Consent Decree.

25 b. If EPA disapproves a proposed Supervising Contractor, EPA will notify Settling  
26 Defendant in writing. Settling Defendant shall submit a list of contractors to EPA, including the  
27 qualifications of each contractor, that would be acceptable to it within 30 days of receipt of EPA's  
28

1 disapproval of the contractor previously proposed. EPA will provide written notice of the names of any  
2 contractor(s) that it disapproves and an authorization to proceed with respect to any of the other  
3 contractors. Settling Defendant may select any contractor from that list that is not disapproved and shall  
4 notify EPA of the name of the contractor selected within 21 days of EPA's authorization to proceed.

5 c. If EPA fails to provide written notice of its authorization to proceed or disapproval  
6 as provided in this Paragraph and this failure prevents Settling Defendant from meeting one or more  
7 deadlines in a plan approved by the EPA pursuant to this Consent Decree, Settling Defendant may seek  
8 relief under the provisions of Section XVIII (Force Majeure) hereof.

9  
10 9. Remedial Action.

11 a. Within 45 days after the approval of the final design submittal, Settling Defendant  
12 shall submit a work plan to EPA for the performance of the Remedial Action at the TSSOU ("Remedial  
13 Action Work Plan"). The Remedial Action Work Plan shall provide for construction and  
14 implementation of the remedy set forth in the ROD and ESDs and achievement of the Performance  
15 Standards, in accordance with this Consent Decree, the ROD, the ESDs, the SOW, and the design plans  
16 and specifications developed in accordance with the Remedial Design Work Plan and approved by EPA.  
17 Upon its approval by EPA, the Remedial Action Work Plan shall be incorporated into and become  
18 enforceable under this Consent Decree. At the same time as it submits the Remedial Action Work Plan,  
19 Settling Defendant shall submit a Health and Safety Plan to EPA for field activities required by the  
20 Remedial Action Work Plan which conforms to the applicable Occupational Safety and Health  
21 Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

22  
23 b. The Remedial Action Work Plan shall include the following: (1) schedule for  
24 completion of the Remedial Action with major milestones as identified in Section III.A. of the SOW;  
25 (2) final Construction Quality Assurance Plan; (3) final Water Quality Monitoring Plan; (4) final Quality  
26 Assurance Project Plan; (5) final Field Sampling Plan; (6) final Operation, Maintenance and Monitoring  
27 Plan; (7) methods for satisfying permit requirements; (8) tentative formulation of Remedial Action team;  
28 (9) a schedule for implementation of all Remedial Action tasks identified in the final design submittal.

1           c.       Upon approval of the Remedial Action Work Plan by EPA, Settling Defendant  
2 shall implement the activities required under the Remedial Action Work Plan. Settling Defendant shall  
3 submit to EPA all plans, submittals, or other deliverables required under the approved Remedial Action  
4 Work Plan in accordance with the approved schedule for review and approval pursuant to Section XI  
5 (EPA Approval of Plans and Other Submissions). Unless otherwise directed by EPA, Settling Defendant  
6 shall not commence physical Remedial Action activities at the TSSOU prior to approval of the Remedial  
7 Action Work Plan.

8           10.     Settling Defendant shall continue to implement the Remedial Action and O&M until the  
9 Performance Standards are achieved and for so long thereafter as is otherwise required under this  
10 Consent Decree.

11  
12           11.     Modification of the SOW or Related Work Plans.

13           a.       If EPA determines that modification to the work specified in the SOW and/or in  
14 work plans developed pursuant to the SOW is necessary to achieve and maintain the Performance  
15 Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, EPA may  
16 require that such modification be incorporated in the SOW and/or such work plans, provided, however,  
17 that a modification may only be required pursuant to this Paragraph to the extent that it is consistent with  
18 the remedy selected in the ROD.

19  
20           b.       If Settling Defendant objects to any modification determined by EPA to be  
21 necessary pursuant to this Paragraph, it may seek dispute resolution pursuant to Section XIX (Dispute  
22 Resolution), record review Paragraph. The SOW and/or related work plans shall be modified in  
23 accordance with final resolution of the dispute.

24           c.       Settling Defendant shall implement any work required by any modifications  
25 incorporated in the SOW and/or in work plans developed pursuant to the SOW in accordance with this  
26 Paragraph.

27  
28           d.       Nothing in this Paragraph shall be construed to limit EPA's authority to require

1 performance of further response actions as otherwise provided in this Consent Decree.

2           12.     Settling Defendant acknowledges and agrees that nothing in this Consent Decree, the  
3 SOW, or the Remedial Design or Remedial Action Work Plans constitutes a warranty or representation  
4 of any kind by Plaintiff that compliance with the work requirements set forth in the SOW and the Work  
5 Plans will achieve the Performance Standards.

6  
7           13.     a.     Settling Defendant shall, prior to any off-Site shipment of Waste Material from  
8 the Site to an out-of-state waste management facility, provide written notification to the appropriate state  
9 environmental official in the receiving facility's state and to the EPA Project Coordinator of such  
10 shipment of Waste Material. However, this notification requirement shall not apply to any off-Site  
11 shipments when the total volume of all such shipments will not exceed 10 cubic yards.

12                       (1)     Settling Defendant shall include in the written notification the following  
13 information, where available: (1) the name and location of the facility to which the Waste Material is  
14 to be shipped; (2) the type and quantity of the Waste Material to be shipped; (3) the expected schedule  
15 for the shipment of the Waste Material; and (4) the method of transportation. Settling Defendant shall  
16 notify the state in which the planned receiving facility is located of major changes in the shipment plan,  
17 such as a decision to ship the Waste Material to another facility within the same state, or to a facility in  
18 another state.

19  
20                       (2)     The identity of the receiving facility and state will be determined by  
21 Settling Defendant following the award of the contract for Remedial Action construction. Settling  
22 Defendant shall provide the information required by Paragraph 13.a. above as soon as practicable after  
23 the award of the contract and before the Waste Material is actually shipped.

24           b.     Before shipping any hazardous substances, pollutants, or contaminants from the  
25 Site to an off-site location, Settling Defendant shall obtain EPA's certification that the proposed  
26 receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3) and  
27 40 C.F.R. 300.440. Settling Defendant shall only send hazardous substances, pollutants, or contaminants  
28

1 from the Site to an off-site facility that complies with the requirements of the statutory provision and  
2 regulations cited in the preceding sentence.

### 3 VII. REMEDY REVIEW

4  
5 14. Periodic Review. Settling Defendant shall conduct any studies and investigations as  
6 requested by EPA, in order to permit EPA to conduct reviews of whether the Remedial Action is  
7 protective of human health and the environment at least every five years as required by Section 121(c)  
8 of CERCLA and any applicable regulations.

9 15. EPA Selection of Further Response Actions. If EPA determines, at any time, that the  
10 Remedial Action is not protective of human health and the environment, EPA may select further  
11 response actions for the TSSOU and/or the Site in accordance with the requirements of CERCLA and  
12 the NCP.

13  
14 16. Opportunity To Comment. Settling Defendant and, if required by Sections 113(k)(2) or  
15 117 of CERCLA, the public, will be provided with an opportunity to comment on any further response  
16 actions proposed by EPA as a result of the review conducted pursuant to Section 121(c) of CERCLA  
17 and to submit written comments for the record during the comment period.

18 17. Settling Defendant's Obligation To Perform Further Response Actions. If EPA selects  
19 further response actions for the TSSOU, Settling Defendant shall undertake such further response  
20 actions to the extent that the reopener conditions in Paragraph 80 or Paragraph 81 (United States'  
21 reservations of liability based on unknown conditions or new information) are satisfied. Settling  
22 Defendant may invoke the procedures set forth in Section XIX (Dispute Resolution) to dispute (1) EPA's  
23 determination that the reopener conditions of Paragraph 80 or Paragraph 81 of Section XXI (Covenants  
24 Not To Sue by Plaintiffs) are satisfied, (2) EPA's determination that the Remedial Action is not  
25 protective of human health and the environment, or (3) EPA's selection of the further response actions.  
26 Disputes pertaining to the whether the Remedial Action is protective or to EPA's selection of further  
27 response actions shall be resolved pursuant to the Record Review Paragraph of Section XIX (Dispute  
28

1 Resolution).

2 18. Submissions of Plans. If Settling Defendant is required to perform the further response  
3 actions pursuant to the preceding Paragraph, it shall submit a plan for such work to EPA for approval  
4 in accordance with the procedures set forth in Section VI (Performance of the Work by Settling  
5 Defendant) and shall implement the plan approved by EPA in accordance with the provisions of this  
6 Decree.

7  
8 VIII. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

9 19. Settling Defendant shall use quality assurance, quality control, and chain of custody  
10 procedures for all treatability, design, compliance and monitoring samples in accordance with "EPA  
11 Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001)  
12 "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998), and  
13 subsequent amendments to such guidelines upon notification by EPA to Settling Defendant of such  
14 amendment. Amended guidelines shall apply only to procedures conducted after such notification. Prior  
15 to the commencement of any monitoring project under this Consent Decree, Settling Defendant shall  
16 submit a Quality Assurance Project Plan ("QAPP") to EPA for approval that is consistent with the  
17 SOW, the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that  
18 validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by EPA  
19 shall be admissible as evidence, without objection, in any proceeding under this Decree. Settling  
20 Defendant shall ensure that EPA personnel and its authorized representatives are allowed access at  
21 reasonable times to all laboratories utilized by Settling Defendant in implementing this Consent Decree.  
22 In addition, Settling Defendant shall ensure that such laboratories shall analyze all samples submitted  
23 by EPA pursuant to the QAPP for quality assurance monitoring. Settling Defendant shall ensure that  
24 the laboratories they utilize for the analysis of samples taken pursuant to this Decree perform all analyses  
25 according to accepted EPA methods. Accepted EPA methods consist of those methods which are  
26 documented in the "Contract Lab Program Statement of Work for Inorganic Analysis" and the "Contract  
27 Lab Program Statement of Work for Organic Analysis," dated February 1988, and any amendments  
28

1 made thereto during the course of the implementation of this Decree; however, upon approval by EPA.  
2 Settling Defendant may use other analytical methods which are as stringent as or more stringent than the  
3 CLP- approved methods. Settling Defendant shall ensure that all laboratories they use for analysis of  
4 samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent QA/QC  
5 program. Settling Defendant shall only use laboratories that have a documented Quality System which  
6 complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for  
7 Environmental Data Collection and Environmental Technology Programs," (American National  
8 Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2),"  
9 (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may  
10 consider laboratories accredited under the National Environmental Laboratory Accreditation Program  
11 (NELAP) as meeting the Quality System requirements. Settling Defendant shall ensure that all field  
12 methodologies utilized in collecting samples for subsequent analysis pursuant to this Decree will be  
13 conducted in accordance with the procedures set forth in the QAPP approved by EPA.

14         20. Upon request, Settling Defendant shall allow split or duplicate samples to be taken by  
15 EPA or its authorized representatives. Settling Defendant shall notify EPA not less than 28 days in  
16 advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA  
17 shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall  
18 allow Settling Defendant to take split or duplicate samples of any samples it takes as part of Plaintiff's  
19 oversight of Settling Defendant's implementation of the Work. EPA shall provide similar notice to  
20 Settling Defendant for any EPA sampling at the TSSOU except for any sampling related to  
21 circumstances set forth in Section XV (Emergency Response).

22  
23         21. Settling Defendant shall submit 5 copies to EPA of the results of all sampling and/or tests  
24 or other data obtained or generated by or on behalf of Settling Defendant with respect to the TSSOU  
25 and/or the implementation of this Consent Decree unless EPA agrees otherwise.

26         22. Notwithstanding any provision of this Consent Decree, the United States hereby retains  
27 all of its information gathering and inspection authorities and rights, including enforcement actions  
28

1 related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

2  
3 IX. ACCESS AND INSTITUTIONAL CONTROLS

4 23. a. To the extent that Settling Defendant has control of the TSSOU, Settling Defendant  
5 shall: commencing on the date of lodging of this Consent Decree, provide the United States and its  
6 representatives, including EPA and its contractors, with access at all reasonable times to the TSSOU,  
7 or such other property, for the purpose of conducting any activity related to this Consent Decree  
8 including, but not limited to, the following activities:

9 (1) Monitoring the Work;

10 (2) Verifying any data or information submitted to the United States;

11 (3) Conducting investigations relating to contamination at or near the Site;

12 (4) Obtaining samples;

13 (5) Assessing the need for, planning, or implementing additional response  
14 actions at or near the Site;

15 (6) Assessing implementation of quality assurance and quality control  
16 practices as defined in the approved Quality Assurance Project Plans;

17 (7) Implementing the Work pursuant to the conditions set forth in Paragraph 84  
18 of this Consent Decree;

19 (8) Inspecting and copying records, operating logs, contracts, or other  
20 documents maintained or generated by Settling Defendant or its agents, consistent with Section XXIV  
21 (Access to Information);

22 (9) Assessing Settling Defendant's compliance with this Consent Decree; and

23 (10) Determining whether the TSSOU or other property is being used in a  
24  
25  
26  
27  
28

1 manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to  
2 this Consent Decree;

3           b.       commencing on the date of lodging of this Consent Decree, refrain from using  
4 the Site, or such other property, in any manner that would interfere with or adversely affect the  
5 implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this  
6 Consent Decree. Such restrictions include, but are not limited to, restrictions which are or shall become  
7 restrictions of record in the TSSOU remedial process, and all measures included in the EPA-approved  
8 Operations and Maintenance Plan to be submitted for EPA approval by Settling Defendant pursuant the  
9 outstanding Administrative Order for Remedial Design for the TSSOU.

10  
11       24.     If the TSSOU, or any other property where access and/or land/water use restrictions are  
12 needed to implement this Consent Decree, is owned or controlled by persons other than Settling  
13 Defendant, Settling Defendant shall use best efforts to secure from such persons:

14           a.       an agreement to provide access thereto for Settling Defendant, as well as for the  
15 United States on behalf of EPA, as well as its representatives (including contractors), for the purpose  
16 of conducting any activity related to this Consent Decree:

17  
18           b.       an agreement, enforceable by Settling Defendant and the United States, to refrain  
19 from using the TSSOU, or such other property, in any manner that would interfere with or adversely  
20 affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant  
21 to this Consent Decree. Such restrictions include, but are not limited to all restrictions which are or shall  
22 become restrictions of record in the TSSOU remedial process, and all measures included in the EPA-  
23 approved Operations and Maintenance Plan to be submitted for EPA approval by Settling Defendant  
24 pursuant the outstanding Administrative Order for Remedial Design for the TSSOU; and

25           c.       the execution and recordation in the Recorder's Office [or Registry of Deeds or  
26 other appropriate land records office] of King County, State of Washington , of an easement, running  
27 with the land, that (i) grants a right of access for the purpose of conducting any activity related to this  
28

1 Consent Decree, and (ii) grants the right to enforce the land/water use restrictions listed in  
2 Paragraph 23.b. of this Consent Decree, or other restrictions that EPA determines are necessary to  
3 implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be  
4 performed pursuant to this Consent Decree. The access rights and/or rights to enforce land/water use  
5 restrictions shall be granted to (i) the United States, on behalf of EPA, and its representatives, (ii) the  
6 State and its representatives, and (iii) the Settling Defendant and its representatives. Within 45 days of  
7 entry of this Consent Decree, Settling Defendant shall submit to EPA for review and approval with  
8 respect to such property:

9 (1) A draft easement that is enforceable under the laws of the State of  
10 Washington, and  
11

12 (2) a current title insurance commitment, or some other evidence of title  
13 acceptable to EPA, which shows title to the land described in the easement to be free and clear  
14 of all prior liens and encumbrances (except when those liens or encumbrances are approved by  
15 EPA or when, despite best efforts, Settling Defendant is unable to obtain release or subordination  
16 of such prior liens or encumbrances)

17 Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Settling  
18 Defendant shall update the title search and, if it is determined that nothing has occurred since the  
19 effective date of the commitment to affect the title adversely, the easement shall be recorded with the  
20 Recorder's Office [or Registry of Deeds or other appropriate office] of King County. Within 30 days of  
21 the recording of the easement, Settling Defendant shall provide EPA with a final title insurance policy,  
22 or other final evidence of title acceptable to EPA, and a certified copy of the original recorded easement  
23 showing the clerk's recording stamps. If the easement is to be conveyed to the United States, the  
24 easement and title evidence (including final title evidence) shall be prepared in accordance with the U.S.  
25 Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as  
26 required by 40 U.S.C. § 255.

27  
28 25. For purposes of this Section, "best efforts" includes the payment of reasonable sums of

money in consideration of access, access easements, land/water use restrictions, restrictive easements, and/or an agreement to release or subordinate a prior lien or encumbrance. If (a) any access or land/water use restriction agreements required by this Consent Decree are not obtained within 45 days of the date of entry of this Consent Decree, (b) or any access easements or restrictive easements required by this Consent Decree are not submitted to EPA in draft form within 45 days of the date of entry of this Consent Decree, or (c) Settling Defendant is unable to obtain an agreement from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the easement being created pursuant to this consent decree within 45 days of the date of entry of this consent decree, Settling Defendant shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Settling Defendant has taken to attempt to comply with the Section.

26. The United States may, as it deems appropriate, assist Settling Defendant in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land, or in obtaining the release or subordination of a prior lien or encumbrance. Settling Defendant shall reimburse the United States in accordance with the procedures in Section XVI (Reimbursement of Response Costs), for all costs incurred, direct or indirect, by the United States in obtaining such access, land/water use restrictions, and/or the release/subordination of prior liens or encumbrances including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

27. Notwithstanding any provision of this Consent Decree, the United States retains all of its access authorities and rights, as well as all of its rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

## X. REPORTING REQUIREMENTS

28. In addition to any other requirement of this Consent Decree, Settling Defendant shall submit 5 copies of written monthly progress reports to EPA that: (a) describe the actions which have been taken toward achieving compliance with this Consent Decree during the previous month; (b)

1 include a summary of all results of sampling and tests and all other data received or generated by Settling  
2 Defendant or its contractors or agents in the previous month; (c) identify all work plans, plans and other  
3 deliverables required by this Consent Decree completed and submitted during the previous month; (d)  
4 describe all actions, including, but not limited to, data collection and implementation of work plans,  
5 which are scheduled for the next six weeks and provide other information relating to the progress of  
6 construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (e)  
7 include information regarding percentage of completion, unresolved delays encountered or anticipated  
8 that may affect the future schedule for implementation of the Work, and a description of efforts made  
9 to mitigate those delays or anticipated delays; (f) include any modifications to the work plans or other  
10 schedules that Settling Defendant has proposed to EPA or that have been approved by EPA; and (g)  
11 describe all activities undertaken in support of the Community Relations Plan during the previous month  
12 and those to be undertaken in the next six weeks. Settling Defendant shall submit these progress reports  
13 to EPA by the tenth day of every month following the Effective Date until EPA notifies Settling  
14 Defendant pursuant to Section XIV (Certification of Completion). If requested by EPA, Settling  
15 Defendant shall also provide briefings for EPA to discuss the progress of the Work.

16         29. Settling Defendant shall notify EPA of any change in the schedule described in the  
17 monthly progress report for the performance of any activity, including, but not limited to, data collection  
18 and implementation of work plans, no later than seven days prior to the performance of the activity.  
19

20         30. Upon the occurrence of any event during performance of the Work that Settling  
21 Defendant is required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency  
22 Planning and Community Right-to-know Act (EPCRA), Settling Defendant shall within 24 hours of the  
23 onset of such event orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator  
24 (in the event of the unavailability of the EPA Project Coordinator), or, if neither the EPA Project  
25 Coordinator or Alternate EPA Project Coordinator is available, the Emergency Response Section,  
26 Region X, United States Environmental Protection Agency. These reporting requirements are in addition  
27 to the reporting required by CERCLA Section 103 or EPCRA Section 304.  
28

1           31.     Within 20 days of the onset of such an event, Settling Defendant shall furnish a written  
2 report to EPA signed by Settling Defendant's Project Coordinator, setting forth the events which  
3 occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion  
4 of such an event, Settling Defendant shall submit a report setting forth all actions taken in response  
5 thereto.

6           32.     Settling Defendant shall submit 10 copies of all plans, reports, and data required by the  
7 SOW, the Remedial Design Work Plan, the Remedial Action Work Plan, or any other approved plans  
8 to EPA in accordance with the schedules set forth in such plans. Upon request by EPA, Settling  
9 Defendant shall submit in electronic form all portions of any report or other deliverable Settling  
10 Defendant is required to submit pursuant to the provisions of this Consent Decree.

11  
12           33.     All reports and other documents submitted by Settling Defendant to EPA (other than the  
13 monthly progress reports referred to above) which purport to document Settling Defendant's compliance  
14 with the terms of this Consent Decree shall be signed by an authorized representative of Settling  
15 Defendant.

16                               XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS  
17

18           34.     After review of any plan, report or other item which is required to be submitted for  
19 approval pursuant to this Consent Decree, EPA, shall: (a) approve, in whole or in part, the submission;  
20 (b) approve the submission upon specified conditions; (c) modify the submission to cure the  
21 deficiencies; (d) disapprove, in whole or in part, the submission, directing that Settling Defendant  
22 modify the submission; or (e) any combination of the above. However, EPA shall not modify a  
23 submission without first providing Settling Defendant at least one notice of deficiency and an  
24 opportunity to cure within 30 days, except where to do so would cause serious disruption to the Work  
25 or where previous submission(s) have been disapproved due to material defects and the deficiencies in  
26 the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

27           35.     In the event of approval, approval upon conditions, or modification by EPA, pursuant to  
28

1 (a), (b), or (c) of the preceding Paragraph, Settling Defendant shall proceed to take any action required  
2 by the plan, report, or other item, as approved or modified by EPA subject only to their right to invoke  
3 the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) with respect to the  
4 modifications or conditions made by EPA. If EPA modifies the submission to cure the deficiencies  
5 pursuant to this Consent Decree and the submission has a material defect, EPA retains its right to seek  
6 stipulated penalties, as provided in Section XX (Stipulated Penalties).

7 36. Resubmission of Plans.

8  
9 a. Upon receipt of a notice of disapproval, Settling Defendant shall, within 30 days  
10 or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan,  
11 report, or other item for approval. Any stipulated penalties applicable to the submission, as provided  
12 in Section XX, shall accrue during the 30-day period or otherwise specified period but shall not be  
13 payable unless the resubmission is disapproved or modified due to a material defect as provided in this  
14 Section.

15 b. Notwithstanding the receipt of a notice of disapproval, Settling Defendant shall  
16 proceed, at the direction of EPA, to take any action required by any non-deficient portion of the  
17 submission. Implementation of any non-deficient portion of a submission shall not relieve Settling  
18 Defendant of any liability for stipulated penalties under Section XX (Stipulated Penalties).

19  
20 37. If a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA,  
21 EPA may again require Settling Defendant to correct the deficiencies, in accordance with this Section.  
22 EPA also retains the right to modify or develop the plan, report or other item. Settling Defendant shall  
23 implement any such plan, report, or item as modified or developed by EPA, subject only to their right  
24 to invoke the procedures set forth in Section XIX (Dispute Resolution).

25 38. If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to  
26 a material defect, Settling Defendant shall be deemed to have failed to submit such plan, report, or item  
27 timely and adequately unless Settling Defendant invokes the dispute resolution procedures set forth in  
28

1 Section XIX (Dispute Resolution) and EPA's action is overturned pursuant to that Section. The  
2 provisions of Section XIX (Dispute Resolution) and Section XX (Stipulated Penalties) shall govern the  
3 implementation of the Work and accrual and payment of any stipulated penalties during Dispute  
4 Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for such  
5 violation from the date on which the initial submission was originally required, as provided in Section  
6 XX.

7 39. All plans, reports, and other items required to be submitted to EPA under this Consent  
8 Decree shall, upon approval or modification by EPA, be enforceable under this Consent Decree. If EPA  
9 approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this  
10 Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

## 11 XII. PROJECT COORDINATORS

12  
13 40. Within 20 days of lodging this Consent Decree, Settling Defendant and EPA will notify  
14 each other, in writing, of the name, address and telephone number of their respective designated Project  
15 Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project  
16 Coordinator initially designated is changed, the identity of the successor will be given to the other Parties  
17 at least 5 working days before the changes occur, unless impracticable, but in no event later than the  
18 actual day the change is made. Settling Defendant's Project Coordinator shall be subject to disapproval  
19 by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work.  
20 Settling Defendant's Project Coordinator shall not be an attorney. He or she may assign other  
21 representatives, including other contractors, to serve as a TSSOU representative for oversight of  
22 performance of daily operations during remedial activities.

23  
24 41. Plaintiff may designate other representatives, including, but not limited to, EPA  
25 employees, and federal contractors and consultants, to observe and monitor the progress of any activity  
26 undertaken pursuant to this Consent Decree. EPA's Project Coordinator and Alternate Project  
27 Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and an On-  
28 Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's

1 Project Coordinator or Alternate Project Coordinator shall have authority, consistent with the National  
2 Contingency Plan, to halt any Work required by this Consent Decree and to take any necessary response  
3 action when s/he determines that conditions at the Site constitute an emergency situation or may present  
4 an immediate threat to public health or welfare or the environment due to release or threatened release  
5 of Waste Material.

6 42. EPA's Project Coordinator and Settling Defendant's Project Coordinator will meet, at a  
7 minimum, on a monthly basis or other agreed upon time interval.

8  
9 XIII. ASSURANCE OF ABILITY TO COMPLETE WORK

10 43. Within 90 days of entry of this Consent Decree, Settling Defendant shall establish and  
11 maintain financial security in the amount of \$12,500,000 in one or more of the following forms:

- 12  
13 a. A surety bond guaranteeing performance of the Work;
- 14 b. One or more irrevocable letters of credit equaling the total estimated cost of the  
15 Work;
- 16  
17 c. A trust fund;
- 18 d. A guarantee to perform the Work by one or more parent corporations or  
19 subsidiaries, or by one or more unrelated corporations that have a substantial business relationship with  
20 Settling Defendant;
- 21  
22 e. A demonstration that Settling Defendant satisfies the requirements of 40 C.F.R.  
23 Part 264.143(f). For these purposes, references in 40 C.F.R. 264.143 (f) to the "sum of current closure  
24 and post-closure costs estimates and the current plugging and abandonment costs estimates" shall mean  
25 the amount of financial security specified above. If Settling Defendant seeks to provide a demonstration  
26 under 40 C.F.R. 264.143(f) and has provided a similar demonstration at other RCRA or CERCLA sites,  
27 the amount for which it was providing financial assurance at those other sites should generally be added  
28 to the estimated costs of the Work from this paragraph.

44. If Settling Defendant seeks to demonstrate the ability to complete the Work through a guarantee by a third party, Settling Defendant shall demonstrate that the guarantor satisfies the requirements of 40 C.F.R. Part 264.143(f). If Settling Defendant seeks to demonstrate its ability to complete the Work by means of the financial test or the corporate guarantee, it shall resubmit sworn statements conveying the information required by 40 C.F.R. Part 264.143(f) annually, on the anniversary of the Effective Date. If EPA determines at any time that the financial assurances provided pursuant to this Section are inadequate, Settling Defendant shall, within 30 days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in the preceding Paragraph. Settling Defendant's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Consent Decree.

45. If Settling Defendant can show that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 43 above after entry of this Consent Decree, Settling Defendant may, on any anniversary date of entry of this Consent Decree, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining work to be performed. Settling Defendant shall submit a proposal for such reduction to EPA, in accordance with the requirements of this Section, and may reduce the amount of the security upon approval by EPA. In the event of a dispute, Settling Defendant may reduce the amount of the security in accordance with the final decision resolving the dispute.

46. Settling Defendant may change the form of financial assurance provided under this Section at any time, upon notice to and approval by EPA, provided that the new form of assurance meets the requirements of this Section. In the event of a dispute, Settling Defendant may change the form of the financial assurance only in accordance with the final decision resolving the dispute.

#### XIV. CERTIFICATION OF COMPLETION

47. Completion of the Remedial Action.

a. Within 90 days after Settling Defendant concludes that the Remedial Action has

1 been fully performed and the Performance Standards have been attained, Settling Defendant shall  
2 schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If,  
3 after the pre-certification inspection, Settling Defendant still believes that the Remedial Action has been  
4 fully performed and the Performance Standards have been attained, it shall submit a written report  
5 requesting certification to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other  
6 Submissions) within 30 days of the inspection. In the report, a registered professional engineer and  
7 Settling Defendant's Project Coordinator shall state that the Remedial Action has been completed in full  
8 satisfaction of the requirements of this Consent Decree. The written report shall include as-built  
9 drawings signed and stamped by a professional engineer. The report shall contain the following  
10 statement, signed by a responsible corporate official of Settling Defendant or its Project Coordinator:

11       To the best of my knowledge, after thorough investigation, I certify under penalty of  
12       perjury that the information contained in or accompanying this submission is true,  
13       accurate and complete. I am aware that there are significant penalties for submitting false  
14       information, including the possibility of fine and imprisonment for knowing violations.

15 If, after completion of the pre-certification inspection and receipt and review of the written report, EPA  
16 determines that the Remedial Action or any portion thereof has not been completed in accordance with  
17 this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Settling  
18 Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this  
19 Consent Decree to complete the Remedial Action and achieve the Performance Standards, provided,  
20 however, that EPA may only require Settling Defendant to perform such activities pursuant to this  
21 Paragraph to the extent that such activities are consistent with the remedy selected in the ROD. EPA  
22 will set forth in the notice a schedule for performance of such activities consistent with the Consent  
23 Decree and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant  
24 to Section XI (EPA Approval of Plans and Other Submissions). Settling Defendant shall perform all  
25 activities described in the notice in accordance with the specifications and schedules established pursuant  
26 to this Paragraph, subject to its right to invoke the dispute resolution procedures set forth in Section XIX  
(Dispute Resolution).

27       b.       If EPA concludes, based on the initial or any subsequent report requesting  
28 Certification of Completion that the Remedial Action has been performed in accordance with this

1 Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing  
2 to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial  
3 Action for purposes of this Consent Decree, including, but not limited to, Section XXI (Covenants Not  
4 to Sue by Plaintiff). Certification of Completion of the Remedial Action shall not affect Settling  
5 Defendant's obligations under this Consent Decree.

6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
XV. EMERGENCY RESPONSE

48. In the event of any action or occurrence during the performance of the Work which causes  
or threatens a release of Waste Material from the TSSOU that constitutes an emergency situation or may  
present an immediate threat to public health or welfare or the environment, Settling Defendant shall  
immediately take all appropriate action to prevent, abate, or minimize such release or threat of release,  
and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable,  
EPA's Alternate Project Coordinator. If neither of these persons is available, Settling Defendant shall  
notify the EPA Emergency Response Unit, Region X. Settling Defendant shall take such actions in  
consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance  
with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other  
applicable plans or documents developed pursuant to the SOW. In the event that Settling Defendant fails  
to take appropriate response action as required by this Section, and EPA takes such action instead,  
Settling Defendant shall reimburse EPA all costs of the response action not inconsistent with the NCP  
pursuant to Section XVI (Payments for Response Costs).

49. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit  
any authority of the United States: a) to take all appropriate action to protect human health and the  
environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste  
Material on, at, or from the Site, or b) to direct or order such action, or seek an order from the Court, to  
protect human health and the environment or to prevent, abate, respond to, or minimize an actual or  
threatened release of Waste Material on, at, or from the Site, subject to Section XXI (Covenants Not to  
Sue by Plaintiff).

XVI. PAYMENTS FOR RESPONSE COSTS

50. Payment for Past Response Costs.

a. Within 30 days of the Effective Date, Settling Defendant shall pay to EPA \$350,000 in payment for Past Response Costs. Payment shall be made by FedWire Electronic Funds Transfer ("EFT") to the U.S. Department of Justice account in accordance with current EFT procedures, referencing USAO File Number 2003Z00424, EPA Site/Spill ID Number 10AB, and DOJ Case Number 90-11-2-970/1. Payment shall be made in accordance with instructions provided to Settling Defendant by the Financial Litigation Unit of the United States Attorney's Office for the Western District of Washington following lodging of the Consent Decree. Any payments received by the Department of Justice after 4:00 p.m. (Eastern Time) will be credited on the next business day.

b. At the time of payment, Settling Defendant shall send notice that payment has been made to the United States, to EPA and to the Regional Financial Management Officer, in accordance with Section XXVI (Notices and Submissions).

c. The total amount to be paid by Settling Defendant pursuant to this Paragraph shall be deposited in the EPA Hazardous Substance Superfund.

51. Payments for Future Response Costs.

a. Settling Defendant shall pay all Future Response Costs not inconsistent with the National Contingency Plan to EPA. On a periodic basis the United States will send Settling Defendant a bill requiring payment that includes an EPA Superfund Cost Recovery Package Imaging and On-Line System (SCORPIOS) cost summary and a Department of Justice cost summary, as appropriate. Settling Defendant shall make all payments within 30 days of Settling Defendant's receipt of each bill requiring payment, except as otherwise provided below. Settling Defendant shall make all payments required by this Paragraph by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party making the payment, EPA Site/Spill ID Number 10AB, and DOJ Case Number 90-11-2-970/1. Settling Defendant shall send the check(s) to:

1 United States Attorney, Financial Litigation Unit, 601 Union Street, Suite 5100, Seattle, WA 98101.

2           b.       At the time of payment, Settling Defendant shall send notice that payment has  
3 been made to the United States, to EPA and to the Regional Financial Management Officer, in  
4 accordance with Section XXVI (Notices and Submissions).

5           c.       The total amount to be paid by Settling Defendant pursuant to this Paragraph shall  
6 be deposited in the EPA Hazardous Substance Superfund.  
7

8  
9  
10       52.       Settling Defendant may contest payment of any Future Response Costs if it determines  
11 that the United States has made an accounting error or if it alleges that a cost item that is included  
12 represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 30  
13 days of receipt of the bill and must be sent to the United States pursuant to Section XXVI (Notices and  
14 Submissions). Any such objection shall specifically identify the contested Future Response Costs and  
15 the basis for objection. In the event of an objection, Settling Defendant shall within the 30-day period  
16 pay all uncontested Future Response Costs to the United States in the manner described in the preceding  
17 Paragraph. Simultaneously, Settling Defendant shall establish an interest-bearing escrow account in a  
18 federally-insured bank duly chartered in the State of Washington and remit to that escrow account funds  
19 equivalent to the amount of the contested Future Response Costs. Settling Defendant shall send to the  
20 United States, as provided in Section XXVI (Notices and Submissions), a copy of the transmittal letter  
21 and check paying the uncontested Future Response Costs, and a copy of the correspondence that  
22 establishes and funds the escrow account, including, but not limited to, information containing the  
23 identity of the bank and bank account under which the escrow account is established as well as a bank  
24 statement showing the initial balance of the escrow account. Simultaneously with establishment of the  
25 escrow account, Settling Defendant shall initiate the Dispute Resolution procedures in Section XIX  
26 (Dispute Resolution). If the United States prevails in the dispute, within 15 days of the resolution of the  
27 dispute, Settling Defendant shall pay the sums due (with accrued interest) to the United States in the  
28 manner described in the preceding Paragraph. If Settling Defendant prevails concerning any aspect of

1 the contested costs, Settling Defendant shall pay that portion of the costs (plus associated accrued  
2 interest) for which they did not prevail to the United States in the manner described in the preceding  
3 Paragraph: Settling Defendant shall be disbursed any balance of the escrow account. The dispute  
4 resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section  
5 XIX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Settling  
6 Defendant's obligation to reimburse the United States for its Future Response Costs.

7       53. If any Past or Future Response Costs payments required by this Consent Decree not  
8 timely made, Settling Defendant shall pay Interest on the unpaid balance. The Interest to be paid on Past  
9 Response Costs under this Paragraph shall begin to accrue on the Effective Date. The Interest on Future  
10 Response Costs shall begin to accrue on the date of receipt of the bill. The Interest shall accrue through  
11 the date of Settling Defendant's payment. Payments of Interest made under this Paragraph shall be in  
12 addition to such other remedies or sanctions available to Plaintiff by virtue of Settling Defendant's  
13 failure to make timely payments under this Section including, but not limited to, payment of stipulated  
14 penalties pursuant to Section XX. Settling Defendant shall make all payments required by this  
15 Paragraph in the manner described in this Section.

#### 16 17                                   XVII. INDEMNIFICATION AND INSURANCE

#### 18       54. Settling Defendant's Indemnification of the United States.

19  
20       a. The United States does not assume any liability by entering into this agreement  
21 or by virtue of any designation of Settling Defendant as EPA's authorized representative under Section  
22 104(e) of CERCLA. Settling Defendant shall indemnify, save and hold harmless the United States and  
23 its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all  
24 claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions  
25 of Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any  
26 persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent  
27 Decree, including, but not limited to, any claims arising from any designation of Settling Defendant as  
28 EPA's authorized representative under Section 104(e) of CERCLA. Further, Settling Defendant agrees

1 to pay the United States all costs it incurs including, but not limited to, attorneys fees and other expenses  
2 of litigation and settlement arising from, or on account of, claims made against the United States based  
3 on negligent or other wrongful acts or omissions of Settling Defendant, its officers, directors, employees,  
4 agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying  
5 out activities pursuant to this Consent Decree. The United States shall not be held out as a party to any  
6 contract entered into by or on behalf of Settling Defendants in carrying out activities pursuant to this  
7 Consent Decree. Neither Settling Defendant nor any such contractor shall be considered an agent of the  
8 United States.

9           b.       The United States shall give Settling Defendant notice of any claim for which the  
10 United States plans to seek indemnification pursuant to this Consent Decree, and shall consult with  
11 Settling Defendant prior to settling such claim.

12  
13       55.       Settling Defendant waives all claims against the United States for damages or  
14 reimbursement or for set-off of any payments made or to be made to the United States arising from or  
15 on account of any contract, agreement, or arrangement between Settling Defendant and any person for  
16 performance of Work on or relating to the TSSOU, including, but not limited to, claims on account of  
17 construction delays. In addition, Settling Defendant shall indemnify and hold harmless the United States  
18 with respect to any and all claims for damages or reimbursement arising from or on account of any  
19 contract, agreement, or arrangement between Settling Defendant and any person for performance of  
20 Work on or relating to the TSSOU, including, but not limited to, claims on account of construction  
21 delays.

22       56.       No later than 15 days before commencing any on-site Work, Settling Defendant shall  
23 secure, and shall maintain until the first anniversary of EPA's Certification of Completion of the  
24 Remedial Action pursuant to Section XIV (Certification of Completion), comprehensive general liability  
25 insurance with limits of \$5 million dollars, combined single limit, and automobile liability insurance  
26 with limits of \$1 million dollars, combined single limit, naming the United States as additional insured.  
27 In addition, for the duration of this Consent Decree, Settling Defendant shall satisfy, or shall ensure that  
28

1 their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision  
2 of worker's compensation insurance for all persons performing the Work on behalf of Settling Defendant  
3 in furtherance of this Consent Decree. Prior to commencement of the Work under this Consent Decree,  
4 Settling Defendant shall provide certificates of such insurance and a copy of each insurance policy to  
5 EPA. Settling Defendant shall resubmit such certificates and copies of policies each year on the  
6 anniversary of the Effective Date. If Settling Defendant demonstrates by evidence satisfactory to EPA  
7 that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance  
8 covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor,  
9 Settling Defendant need provide only that portion of the insurance described above which is not  
10 maintained by the contractor or subcontractor.

#### 11 XVIII. FORCE MAJEURE

12  
13 57. "Force majeure," for purposes of this Consent Decree, is defined as any event arising  
14 from causes beyond the control of Settling Defendant, of any entity controlled by Settling Defendant,  
15 or of Settling Defendant's contractors, that delays or prevents the performance of any obligation under  
16 this Consent Decree despite Settling Defendant's best efforts to fulfill the obligation. The requirement  
17 that Settling Defendant exercise "best efforts to fulfill the obligation" includes using best efforts to  
18 anticipate any potential force majeure event and best efforts to address the effects of any potential force  
19 majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the  
20 delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability  
21 to complete the Work or a failure to attain the Performance Standards.

22  
23 58. If any event occurs or has occurred that may delay the performance of any obligation  
24 under this Consent Decree, whether or not caused by a force majeure event, Settling Defendant shall  
25 notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator  
26 or, in the event both of EPA's designated representatives are unavailable, the Director of the Office of  
27 Environmental Cleanup, EPA Region X, within 48 hours of when Settling Defendant first knew that the  
28 event might cause a delay. Within 5 days thereafter, Settling Defendant shall provide to EPA in writing

1 an explanation and description of the reasons for the delay; the anticipated duration of the delay; all  
2 actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any  
3 measures to be taken to prevent or mitigate the delay or the effect of the delay; Settling Defendant's  
4 rationale for attributing such delay to a force majeure event if they intend to assert such a claim; and a  
5 statement as to whether, in the opinion of Settling Defendant, such event may cause or contribute to an  
6 endangerment to public health, welfare or the environment. Settling Defendant shall include with any  
7 notice all available documentation supporting its claim that the delay was attributable to a force majeure.  
8 Failure to comply with the above requirements shall preclude Settling Defendant from asserting any  
9 claim of force majeure for that event for the period of time of such failure to comply, and for any  
10 additional delay caused by such failure. Settling Defendant shall be deemed to know of any  
11 circumstance of which Settling Defendant, any entity controlled by Settling Defendant or Settling  
12 Defendant's contractors knew or should have known.

13 59. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event,  
14 the time for performance of the obligations under this Consent Decree that are affected by the force  
15 majeure event will be extended by for such time as is necessary to complete those obligations. An  
16 extension of the time for performance of the obligations affected by the force majeure event shall not,  
17 of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay  
18 or anticipated delay has been or will be caused by a force majeure event, EPA will notify Settling  
19 Defendant in writing of its decision. If EPA agrees that the delay is attributable to a force majeure  
20 event, EPA will notify Settling Defendant in writing of the length of the extension, if any, for  
21 performance of the obligations affected by the force majeure event.

22  
23 60. If Settling Defendant elects to invoke the dispute resolution procedures set forth in  
24 Section XIX (Dispute Resolution), it shall do so no later than 15 days after receipt of EPA's notice. In  
25 any such proceeding, Settling Defendant shall have the burden of demonstrating by a preponderance of  
26 the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that  
27 the duration of the delay or the extension sought was or will be warranted under the circumstances, that  
28 best efforts were exercised to avoid and mitigate the effects of the delay, and that Settling Defendant

1 complied with the requirements of this Section. If Settling Defendant carries this burden, the delay at  
2 issue shall be deemed not to be a violation by Settling Defendant of the affected obligation of this  
3 Consent Decree identified to EPA and the Court.

#### 4 XIX. DISPUTE RESOLUTION

5  
6 61. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution  
7 procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with  
8 respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to  
9 actions by the United States to enforce obligations of Settling Defendant that have not been disputed in  
10 accordance with this Section.

11 62. Any dispute which arises under or with respect to this Consent Decree shall in the first  
12 instance be the subject of informal negotiations between the parties to the dispute. The period for  
13 informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by  
14 written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one  
15 party sends the other party a written Notice of Dispute.

#### 16 63. Statement of Position.

17  
18 a. If the parties cannot resolve a dispute by informal negotiations under the  
19 preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within 10  
20 days after the conclusion of the informal negotiation period, Settling Defendant invokes the formal  
21 dispute resolution procedures of this Section by serving on the United States a written Statement of  
22 Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion  
23 supporting that position and any supporting documentation relied upon by Settling Defendant. The  
24 Statement of Position shall specify Settling Defendant's position as to whether formal dispute resolution  
25 should proceed under the following Paragraph or the Paragraph thereafter.

26  
27 b. If there is disagreement between EPA and Settling Defendant as to whether  
28 dispute resolution should proceed under the following Paragraph or the Paragraph thereafter, the parties

1 to the dispute shall follow the procedures set forth in the Paragraph determined by EPA to be applicable.  
2 However, if Settling Defendant ultimately appeals to the Court to resolve the dispute, the Court shall  
3 determine which Paragraph is applicable in accordance with the standards of applicability set forth in  
4 this Section.

5         64. Formal dispute resolution for disputes pertaining to the selection or adequacy of any  
6 response action and all other disputes that are accorded review on the administrative record under  
7 applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this  
8 Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without  
9 limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other  
10 items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance  
11 of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be  
12 construed to allow any dispute by Settling Defendant regarding the validity of the ROD's provisions.

13  
14         a. An administrative record of the dispute shall be maintained by EPA and shall  
15 contain Settling Defendant's Statement of Position and any responses by EPA, including supporting  
16 documentation. Where appropriate, EPA may allow submission of supplemental statements of position  
17 by Settling Defendant.

18         b. The Director of the Office of Environmental Cleanup ("ECL Director"), EPA  
19 Region X, will issue a final administrative decision resolving the dispute based on the administrative  
20 record described in this Paragraph. This decision shall be binding upon Settling Defendant, subject only  
21 to the right to seek judicial review pursuant to this Paragraph.

22  
23         c. Any administrative decision made by EPA pursuant to this Paragraph shall be  
24 reviewable by this Court, provided that a motion for judicial review of the decision is filed by Settling  
25 Defendant with the Court and served on the United States within 10 days of receipt of EPA's decision.  
26 The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve  
27 it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure  
28 orderly implementation of this Consent Decree. The United States may file a response to Settling

1 Defendant's motion.

2 d. In proceedings on any dispute governed by this Paragraph, Settling Defendant  
3 shall have the burden of demonstrating that the decision of the ECL Director is arbitrary and capricious  
4 or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the  
5 administrative record compiled pursuant to this Paragraph.

6  
7 65. Formal dispute resolution for disputes that neither pertain to the selection or adequacy  
8 of any response action nor are otherwise accorded review on the administrative record under applicable  
9 principles of administrative law, shall be governed by this Paragraph.

10 a. Following receipt of Settling Defendant's Statement of Position, the ECL  
11 Director, will issue a final decision resolving the dispute. The ECL Director's decision shall be binding  
12 on Settling Defendant unless, within 10 days of receipt of the decision, Settling Defendant files with the  
13 Court and serves on the United States a motion for judicial review of the decision setting forth the matter  
14 in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any,  
15 within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The  
16 United States may file a response to Settling Defendant's motion.

17  
18 b. Judicial review of any dispute governed by this Paragraph shall be governed by  
19 applicable principles of law.

20 66. The invocation of formal dispute resolution procedures under this Section shall not  
21 extend, postpone or affect in any way any obligation of Settling Defendant under this Consent Decree,  
22 not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to  
23 the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute  
24 as provided in this Section. Notwithstanding the stay of payment, stipulated penalties shall accrue from  
25 the first day of noncompliance with any applicable provision of this Consent Decree. If Settling  
26 Defendant does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as  
27 provided in Section XX (Stipulated Penalties).

XX. STIPULATED PENALTIES

67. Settling Defendant shall be liable for stipulated penalties in the amounts set forth in this Section below to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XVIII (Force Majeure) or otherwise by EPA. "Compliance" by Settling Defendant shall include completion of the activities under this Consent Decree or any work plan or other plan approved under this Consent Decree identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

68. Stipulated Penalty Amounts - Work.

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in this Paragraph:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th day
\$3,500	15th through 30th day
\$7,500	31st through 90th day

b. Compliance Milestones.

- (1) Remedial Action Work Plan
- (2) Initiate construction of remedial action
- (3) Completion of construction
- (4) Final Construction Inspection
- (5) Remedial Action Construction Report

69. Stipulated Penalty Amounts - Reports.

a. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to this Consent Decree:

1                    Penalty Per Violation Per Day                    Period of Noncompliance

2                    \$500                    1st through 14th day  
3                    \$2,000                    15th through 30th day  
4                    \$5,000                    31st through 90th day

5                    70.        These penalties shall not apply for Settling Defendant's first modification of any  
6 deliverable as requested by EPA if Settling Defendant's first modification is approved by EPA.

7  
8                    71.        All penalties shall begin to accrue on the day after the complete performance is due or  
9 the day a violation occurs, and shall continue to accrue through the final day of the correction of the  
10 noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (1) with  
11 respect to a deficient submission under Section XI (EPA Approval of Plans and Other Submissions),  
12 during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date  
13 that EPA notifies Settling Defendant of any deficiency; (2) with respect to a decision by the ECL  
14 Director pursuant to Section XIX (Dispute Resolution), during the period, if any, beginning on the 31st  
15 day after the submission of Settling Defendant's Statement of Position is received until the date that the  
16 ECL Director issues a final decision regarding such dispute; or (3) with respect to judicial review by this  
17 Court of any dispute under Section XIX (Dispute Resolution), during the period, if any, beginning on  
18 the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the  
19 Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous  
20 accrual of separate penalties for separate violations of this Consent Decree.

21                    72.        Following EPA's determination that Settling Defendant has failed to comply with a  
22 requirement of this Consent Decree, EPA may give Settling Defendant written notification of such  
23 failure and describe the noncompliance. EPA may send Settling Defendant a written demand for the  
24 payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph  
25 regardless of whether EPA has notified Settling Defendant of a violation.

26  
27                    73.        All penalties accruing under this Section shall be due and payable to the United States  
28 within 30 days of Settling Defendant's receipt from EPA of a demand for payment of the penalties,

1 unless Settling Defendant invokes the Dispute Resolution procedures under Section XIX (Dispute  
2 Resolution). All payments to the United States under this Section shall be paid by certified or cashier's  
3 check(s) made payable to "EPA Hazardous Substances Superfund," shall be mailed to Mellon Bank.  
4 EPA Region X, ATTN: Superfund Accounting, P.O. Box 360903M, Pittsburgh, PA 15251, shall indicate  
5 that the payment is for stipulated penalties, and shall reference the EPA Region and Site/Spill ID #10AB,  
6 the DOJ Case Number 90-11-2-970/1, and the name and address of the party making payment. Copies  
7 of checks paid pursuant to this Section, and any accompanying transmittal letters, shall be sent to the  
8 United States as provided in Section XXVI (Notices and Submissions).

9  
10 74. The payment of penalties shall not alter in any way Settling Defendant's obligation to  
11 complete the performance of the Work required under this Consent Decree.

12 75. Penalties shall continue to accrue as provided above during any dispute resolution period,  
13 but need not be paid until the following:

14 a. If the dispute is resolved by agreement or by a decision of EPA that is not  
15 appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 15 days  
16 of the agreement or the receipt of EPA's decision or order;

17  
18 b. If the dispute is appealed to this Court and the United States prevails in whole or  
19 in part, Settling Defendant shall pay all accrued penalties determined by the Court to be owed to EPA  
20 within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

21 c. If the District Court's decision is appealed by any Party, Settling Defendant shall  
22 pay all accrued penalties determined by the District Court to be owing to the United States into an  
23 interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall  
24 be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt  
25 of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to  
26 Settling Defendant to the extent that it prevails.

27  
28 76. If Settling Defendant fails to pay stipulated penalties when due, the United States may

1 institute proceedings to collect the penalties, as well as interest. Settling Defendant shall pay Interest  
2 on the unpaid balance, which shall begin to accrue on the date of the demand made in accordance with  
3 this Section.

4 77. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way  
5 limiting the ability of the United States to seek any other remedies or sanctions available by virtue of  
6 Settling Defendant's violation of this Decree or of the statutes and regulations upon which it is based,  
7 including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, provided, however, that  
8 the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation  
9 for which a stipulated penalty is provided herein.

10 78. Notwithstanding any other provision of this Section, the United States may, in its  
11 unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this  
12 Consent Decree.

13  
14 XXI. COVENANTS NOT TO SUE BY PLAINTIFF

15 79. In consideration of the actions that will be performed and the payments that will be made  
16 by Settling Defendant under the terms of the Consent Decree, and except as specifically provided below,  
17 the United States covenants not to sue or to take administrative action against Settling Defendant  
18 pursuant to Sections 106 and 107(a) of CERCLA relating to the TSSOU. Except with respect to future  
19 liability, these covenants not to sue shall take effect upon the receipt by EPA of the payments required  
20 by Section XVI (Payments for Response Costs). With respect to future liability, these covenants not to  
21 sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Section  
22 XIV (Certification of Completion). These covenants not to sue are conditioned upon the satisfactory  
23 performance by Settling Defendant of its obligations under this Consent Decree. These covenants not  
24 to sue extend only to Settling Defendant and do not extend to any other person.

25  
26 80. United States' Pre-certification Reservations. Notwithstanding any other provision of this  
27 Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right  
28

1 to institute proceedings in this action or in a new action, or to issue an administrative order seeking to  
2 compel Settling Defendant

3 a. to perform further response actions relating to the TSSOU, or

4  
5 b. to reimburse the United States for additional costs of response if, prior to

6 Certification of Completion of the Remedial Action:

7 (1) conditions at the TSSOU, previously unknown to EPA, are discovered,  
8 unless those conditions are caused by recontamination of sediments by any person not a signatory  
9 to this Consent Decree, or

10  
11 (2) information, previously unknown to EPA, is received, in whole or in part,  
12 and EPA determines that these previously unknown conditions or information together with any  
13 other relevant information indicates that the Remedial Action is not protective of human health  
14 or the environment.

15 81. United States' Post-certification Reservations. Notwithstanding any other provision of  
16 this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the  
17 right to institute proceedings in this action or in a new action, or to issue an administrative order seeking  
18 to compel Settling Defendant

19  
20 a. to perform further response actions relating to the TSSOU, or

21 b. to reimburse the United States for additional costs of response if, subsequent to

22 Certification of Completion of the Remedial Action:

23  
24 (1) conditions at the TSSOU, previously unknown to EPA, are discovered,  
25 unless those conditions are caused by recontamination of sediments by any person not a signatory  
26 to this Consent Decree, or

27 (2) information, previously unknown to EPA, is received, in whole or in part,  
28

1 and EPA determines that these previously unknown conditions or this information together with  
2 other relevant information indicate that the Remedial Action is not protective of human health  
3 or the environment.

4 82. For purposes of Paragraph 80, the information and the conditions known to EPA shall  
5 include only that information and those conditions known to EPA as of the date the second ESD was  
6 issued and set forth in the ROD for the former SSOU as modified by both ESDs for the TSSOU, and the  
7 administrative record supporting the ROD and both ESDs. For purposes of Paragraph 81, the  
8 information and the conditions known to EPA shall include only that information and those conditions  
9 known to EPA as of the date of Certification of Completion of the Remedial Action and set forth in the  
10 ROD and both ESDs, the administrative record supporting the ROD and both ESDs, the post-ROD  
11 administrative record, or in any information received by EPA pursuant to the requirements of this  
12 Consent Decree prior to Certification of Completion of the Remedial Action.

13  
14 83. General reservations of rights. The United States reserves, and this Consent Decree is  
15 without prejudice to, all rights against Settling Defendant with respect to all matters not expressly  
16 included within Plaintiff's covenant not to sue. Notwithstanding any other provision of this Consent  
17 Decree, the United States reserves all rights against Settling Defendant with respect to:

18 a. claims based on a failure by Settling Defendant to meet a requirement of this  
19 Consent Decree;

20  
21 b. liability arising from the past, present, or future disposal, release, or threat of  
22 release of Waste Material outside of the TSSOU;

23 c. liability based upon Settling Defendant's operations affecting the TSSOU after  
24 entry of this Consent Decree, or upon Settling Defendant's transportation, treatment, storage, or disposal,  
25 or the arrangement for the transportation, treatment, storage, or disposal of Waste Material at or in  
26 connection with the Site, other than as provided in the ROD, the Work, or otherwise ordered by EPA,  
27 after signature of this Consent Decree by Settling Defendant;

1 d. liability for damages for injury to, destruction of, or loss of natural resources, and  
2 for the costs of any natural resource damage assessments:

3 e. criminal liability;

4  
5 f. liability for violations of federal or state law which occur during or after  
6 implementation of the Remedial Action; and

7 g. liability, prior to Certification of Completion of the Remedial Action, for  
8 additional response actions that EPA determines are necessary to achieve Performance Standards, but  
9 that cannot be required pursuant to Paragraph 11 (Modification of the SOW or Related Work Plans);  
10

11 h. previously incurred costs of response related to the TSSOU, but not Past  
12 Response Costs or Interim Response Costs reimbursed pursuant to this Consent Decree;

13 i. liability for additional operable units at the Site;

14  
15 j. liability for costs that the United States will incur related to the Site but are not  
16 within the definition of Future Response Costs;

17 k. liability for costs incurred or to be incurred by the Agency for Toxic Substances  
18 and Disease Registry related to the Site.  
19

20 84. Work Takeover If EPA determines that Settling Defendant has ceased implementation  
21 of any portion of the Work, is seriously or repeatedly deficient or late in its performance of the Work,  
22 or is implementing the Work in a manner which may cause an endangerment to human health or the  
23 environment, EPA may assume the performance of all or any portions of the Work as EPA determines  
24 necessary. Settling Defendant may invoke the procedures set forth in Section XIX (Dispute Resolution),  
25 to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Costs  
26 incurred by the United States in performing the Work pursuant to this Paragraph shall be considered  
27 Future Response Costs that Settling Defendant shall pay pursuant to Section XVI (Payment for Response  
28 Costs).

85. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by law.

## XXII. Covenants by Settling Defendant

86. Covenant Not to Sue. Subject to the reservations below, Settling Defendant hereby covenants not to sue and agrees not to assert any claims or causes of action against the United States with respect to the TSSOU, and Past and Future Response Costs as defined herein, or this Consent Decree, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law;

b. any claims against the United States, including any department, agency or instrumentality of the United States under CERCLA Sections 107 or 113 related to the TSSOU, or

c. any claims arising out of response actions at or in connection with the TSSOU, including any claim under the United States Constitution, the Washington Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law.

Except as provided in Paragraph 89 (Waiver of Claims Against De Micromis Parties) and Paragraph 94 (Waiver of Claim-Splitting Defenses), these covenants not to sue shall not apply in the event that the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 80, 81, 83 (b) - (d) or (g) - (k), but only to the extent that Settling Defendant's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

87. Settling Defendant reserves, and this Consent Decree is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or

1 wrongful act or omission of any employee of the United States while acting within the scope of his office  
2 or employment under circumstances where the United States, if a private person, would be liable to the  
3 claimant in accordance with the law of the place where the act or omission occurred. However, any such  
4 claim shall not include a claim for any damages caused, in whole or in part, by the act or omission of  
5 any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C.  
6 § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the  
7 oversight or approval of Settling Defendant's plans or activities. The foregoing applies only to claims  
8 which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign  
9 immunity is found in a statute other than CERCLA.

10 88. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim  
11 within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

12  
13 89. Settling Defendant agrees not to assert any claims and to waive all claims or causes of  
14 action that they may have for all matters relating to the TSSOU, including for contribution, against any  
15 person where the person's liability to Settling Defendant with respect to the TSSOU is based solely on  
16 having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous  
17 substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances  
18 at the Site, if:

19 a. the materials contributed by such person to the Site containing hazardous  
20 substances did not exceed the greater of (i) 0.002% of the total volume of waste at the Site, or (ii) 110  
21 gallons of liquid materials or 200 pounds of solid materials.

22  
23 b. This waiver shall not apply to any claim or cause of action against any person  
24 meeting the above criteria if EPA has determined that the materials contributed to the TSSOU by such  
25 person contributed or could contribute significantly to the costs of response at the TSSOU. This waiver  
26 also shall not apply with respect to any defense, claim, or cause of action that Settling Defendant may  
27 have against any person if such person asserts a claim or cause of action relating to the TSSOU against  
28 Settling Defendant.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

90. Except as provided in the preceding Paragraph (Waiver of Claims Against De Micromis Parties), nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Except as provided in the Waiver of Claims Against De Micromis Parties, each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the TSSOU against any person not a Party hereto.

91. The Parties agree, and by entering this Consent Decree this Court finds, that Settling Defendant is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2) for matters addressed in this Consent Decree. Matters addressed in this Consent Decree include implementation of the remedial action at the TSSOU in accordance with the ROD and ESDs, as well as the payment of Past, Interim and Future response costs to EPA pursuant to this Consent Decree.

92. Settling Defendant agrees that with respect to any suit or claim for contribution brought by it for matters related to this Consent Decree it will notify the United States in writing no later than 60 days prior to the initiation of such suit or claim.

93. Settling Defendant also agrees that with respect to any suit or claim for contribution brought against it for matters related to this Consent Decree it will notify the United States in writing within 10 days of service of the complaint on it. In addition, Settling Defendant shall notify the United States within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial.

94. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the TSSOU, Settling

1 Defendant shall not assert, and may not maintain, any defense or claim based upon the principles of  
2 waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon  
3 any contention that the claims raised by the United States in the subsequent proceeding were or should  
4 have been brought in the instant case; provided, however, that nothing in this Paragraph affects the  
5 enforceability of the covenants not to sue set forth in Section XXI (Covenants Not to Sue by Plaintiff).

6  
7  
8 XXIV. ACCESS TO INFORMATION

9 95. Settling Defendant shall provide EPA upon request with copies of all documents and  
10 information within its possession or control or that of its contractors or agents relating to activities at the  
11 TSSOU or to the implementation of this Consent Decree, including, but not limited to, sampling,  
12 analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing,  
13 correspondence, or other documents or information related to the Work. Settling Defendant shall also  
14 make available to EPA for purposes of investigation, information gathering, or testimony, its employees,  
agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

15 96. Business Confidential and Privileged Documents.  
16

17 a. Settling Defendant may assert business confidentiality claims covering part or all  
18 of the documents or information submitted to Plaintiff under this Consent Decree to the extent permitted  
19 by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R.  
20 § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the  
21 protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies  
22 documents or information when they are submitted to EPA, or if EPA has notified Settling Defendant  
23 that the documents or information are not confidential under the standards of Section 104(e)(7) of  
24 CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or  
25 information without further notice to Settling Defendant.

26 b. Settling Defendant may assert that certain documents, records and other  
27 information are privileged under the attorney-client privilege or any other privilege recognized by federal  
28

1 law. If Settling Defendant asserts such a privilege in lieu of providing documents, it shall provide  
2 Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the  
3 document, record, or information; (3) the name and title of the author of the document, record, or  
4 information; (4) the name and title of each addressee and recipient; (5) a description of the contents of  
5 the document, record, or information; and (6) the privilege asserted by Settling Defendant. However,  
6 no documents, reports or other information created or generated pursuant to the requirements of the  
7 Consent Decree shall be withheld on the grounds that they are privileged.

8 97. No claim of confidentiality shall be made with respect to any data, including, but not  
9 limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data,  
10 or any other documents or information evidencing conditions at or around the Site.

#### 11 XXV. RETENTION OF RECORDS

12  
13 98. Until 10 years after Settling Defendant's receipt of EPA's notification pursuant to Section  
14 XIV (Certification of Completion of the Work), Settling Defendant shall preserve and retain all non-  
15 identical copies of records and documents (including records or documents in electronic form) now in  
16 its possession or control or which come into its possession or control that relate in any manner to its  
17 liability under CERCLA with respect to the TSSOU. Settling Defendant must also retain, and instruct  
18 its contractors and agents to preserve, for the same period of time specified above all non-identical  
19 copies of the last draft or final version of any documents or records (including documents or records in  
20 electronic form) now in its possession or control or which come into its possession or control that relate  
21 in any manner to the performance of the Work, provided, however, that Settling Defendant (and its  
22 contractors and agents) must retain, in addition, copies of all data generated during the performance of  
23 the Work and not contained in the aforementioned documents required to be retained. Each of the above  
24 record retention requirements shall apply regardless of any corporate retention policy to the contrary.

25  
26 99. At the conclusion of this document retention period, Settling Defendant shall notify the  
27 United States at least 90 days prior to the destruction of any such records or documents, and, upon  
28 request by the United States, Settling Defendant shall deliver any such records or documents to EPA.

1 Settling Defendant may assert that certain documents, records and other information are privileged under  
2 the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant  
3 asserts such a privilege, it shall provide the Plaintiff with the following: (1) the title of the document,  
4 record, or information; (2) the date of the document, record, or information; (3) the name and title of the  
5 author of the document, record, or information; (4) the name and title of each addressee and recipient;  
6 (5) a description of the subject of the document, record, or information; and (6) the privilege asserted  
7 by Settling Defendant. However, no documents, reports or other information created or generated  
8 pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are  
9 privileged.

10 100. Settling Defendant hereby certifies under penalty of perjury that, to the best of its  
11 knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or  
12 otherwise disposed of any records, documents or other information (other than identical copies) relating  
13 to its potential liability regarding the TSSOU since notification of potential liability by the United States  
14 or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA  
15 requests for information pursuant to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. 9604(e) and  
16 9622(e), and Section 3007 of RCRA, 42 U.S.C. 6927.

#### 17 XXVI. NOTICES AND SUBMISSIONS

18  
19 101. Whenever, under the terms of this Consent Decree, written notice is required to be given  
20 or a report or other document is required to be sent by one Party to another, it shall be directed to the  
21 individuals at the addresses specified below, unless those individuals or their successors give notice of  
22 a change to the other Parties in writing. All notices and submissions shall be considered effective upon  
23 receipt, unless otherwise provided. Written notice as specified herein shall constitute complete  
24 satisfaction of any written notice requirement of the Consent Decree with respect to the United States,  
25 EPA, and Settling Defendant, respectively.  
26  
27  
28

1 As to the United States:

Chief, Environmental Enforcement Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
P.O. Box 7611  
Washington, D.C. 20044-7611  
Re: DJ # \_\_\_\_\_

4 and

Director, Environmental Cleanup Office  
United States Environmental Protection Agency  
Region X (ECL-117)  
1200 6th Avenue  
Seattle, WA 98101

8 As to EPA:

Lynda Priddy  
EPA Project Coordinator  
United States Environmental Protection Agency  
Region X (ECL-112)  
1200 6th Avenue  
Seattle, WA 98101

11 and

Financial Management Officer  
United States Environmental Protection Agency  
Region 10 (OMP-146)  
1200 6th Avenue  
Seattle, WA 98101

15 As to the Settling Defendant:

Al Rainsberger  
Todd Pacific Shipyards  
P.O. Box 3086  
Seattle, WA 98124

18 XXVII. EFFECTIVE DATE

19 102. The effective date of this Consent Decree shall be the date upon which this Consent  
20 Decree is entered by the Court, except as otherwise provided herein.

22 XXVIII. RETENTION OF JURISDICTION

23 103. This Court retains jurisdiction over both the subject matter of this Consent Decree and  
24 Settling Defendant for the duration of the performance of the terms and provisions of this Consent  
25 Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further  
26 order, direction, and relief as may be necessary or appropriate for the construction or modification of this  
27 Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in  
28 accordance with Section XIX (Dispute Resolution) hereof.

1 XXIX. APPENDICES

2 104. The following appendices are attached to and incorporated into this Consent Decree:

3  
4 "Appendix A" is the SOW.

5 "Appendix B" is the ROD and both ESDs.

6  
7 XXX. Community Relations

8 105. Settling Defendant shall propose to EPA their participation in the community relations  
9 plan to be developed by EPA. EPA will determine the appropriate role for Settling Defendant under the  
10 Plan. Settling Defendant shall also cooperate with EPA in providing information regarding the Work  
11 to the public. As requested by EPA, Settling Defendant shall participate in the preparation of such  
12 information for dissemination to the public and in public meetings which may be held or sponsored by  
13 EPA to explain activities at or relating to the TSSOU.

14  
15 XXXI. MODIFICATION

16 106. Schedules specified in this Consent Decree for completion of the Work may be modified  
17 by agreement of EPA and Settling Defendant. All such modifications shall be made in writing.

18  
19 107. Except as provided in Paragraph 11 (Modification of the SOW or Related Work Plans),  
20 no material modifications shall be made to the SOW without written notification to and written approval  
21 of the United States, Settling Defendant, and the Court, if such modifications fundamentally alter the  
22 basic features of the selected remedy within the meaning of 40 C.F.R. 300.435(c)(2)(B)(ii). Prior to  
23 providing its approval to any modification, the United States will provide the State with a reasonable  
24 opportunity to review and comment on the proposed modification. Modifications to the SOW that do  
25 not materially alter that document, or material modifications to the SOW that do not fundamentally alter  
26 the basic features of the selected remedy within the meaning of 40 C.F.R.300.435(c)(2)(B)(ii), may be  
27 made by written agreement between EPA and Settling Defendant.

1 108. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise  
2 or approve modifications to this Consent Decree.

3 XXXII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT  
4

5 109. This Consent Decree shall be lodged with the Court for a period of not less than thirty  
6 (30) days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C.  
7 § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its  
8 consent if the comments regarding the Consent Decree disclose facts or considerations which indicate  
9 that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendant consents to the  
10 entry of this Consent Decree without further notice.

11 110. If for any reason the Court should decline to approve this Consent Decree in the form  
12 presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement  
13 may not be used as evidence in any litigation between the Parties.  
14

15 XXXIII. SIGNATORIES/SERVICE

16 111. The undersigned representative of Settling Defendant and the Assistant Attorney General  
17 for the Environment and Natural Resources Division of the Department of Justice certify under penalty  
18 of perjury respectively, that he or she is fully authorized to enter into this Consent Decree and to execute  
19 and legally bind such Party to this document.  
20

21 112. Settling Defendant hereby agrees not to oppose entry of this Consent Decree by this Court  
22 or to challenge any provision of this Consent Decree unless the United States has notified Settling  
23 Defendant in writing that it no longer supports entry of the Consent Decree.

24 113. Settling Defendant shall identify, on the attached signature page, the name, address and  
25 telephone number of an agent who is authorized to accept service of process by mail on its behalf with  
26 respect to all matters arising under or relating to this Consent Decree. Settling Defendant hereby agrees  
27 to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the  
28

1 Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited  
2 to, service of a summons. The parties agree that Settling Defendant need not file an answer to the  
3 complaint in this action unless or until the court expressly declines to enter this Consent Decree.

4  
5 XXXIV. FINAL JUDGEMENT

6 114. This Consent Decree and its appendices constitute the final, complete, and exclusive  
7 agreement and understanding between the parties with respect to the settlement embodied in the Consent  
8 Decree. The parties acknowledge that there are no representations, agreements or understandings  
9 relating to the settlement other than those expressly contained in this Consent Decree.

10 115. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall  
11 constitute a final judgment between the United States and Settling Defendant. The Court finds that there  
12 is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P.  
13 54 and 58.

14  
15  
16  
17  
18  
19 SO ORDERED THIS \_\_ DAY OF \_\_\_\_\_, 20\_\_.

20  
21  
22  
23 \_\_\_\_\_  
24 United States District Judge  
25  
26  
27  
28

1 THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Todd  
2 Martin Corporation, relating to the Todd Shipyard Sediment Operable Unit of the Harbor Island  
3 Superfund Site.

4 FOR THE UNITED STATES OF AMERICA

5  
6 5.15.03

7 Date

Tom Sansonetti

Thomas L. Sansonetti  
Assistant Attorney General  
Environment and Natural Resources Division  
U.S. Department of Justice  
Washington, D.C. 20530

9  
10 JL Nicoll

11 Date

James L. Nicoll  
Senior Attorney  
Environmental Enforcement Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
NOAA GC-DOJ DARC  
7600 Sand Point Way, NE  
Seattle, WA 98115

12  
13  
14  
15  
16  
17 Date

L. John Iani  
Regional Administrator, Region X  
U.S. Environmental Protection Agency  
1200 Sixth Avenue  
Seattle, WA 98101

1 THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Todd  
2 Martin Corporation, relating to the Todd Shipyard Sediment Operable Unit of the Harbor Island  
3 Superfund Site.

4 FOR THE UNITED STATES OF AMERICA

5  
6 \_\_\_\_\_  
Date

\_\_\_\_\_  
Thomas L. Sansonetti  
Assistant Attorney General  
Environment and Natural Resources Division  
U.S. Department of Justice  
Washington, D.C. 20530

7  
8  
9  
10  
11 \_\_\_\_\_  
Date

\_\_\_\_\_  
James L. Nicoll  
Senior Attorney  
Environmental Enforcement Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
NOAA GC-DOJ DARC  
7600 Sand Point Way, NE  
Seattle, WA 98115

12  
13  
14  
15  
16 \_\_\_\_\_  
Date

\_\_\_\_\_  
L. John Iani  
Regional Administrator, Region X  
U.S. Environmental Protection Agency  
1200 Sixth Avenue  
Seattle, WA 98101

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

FOR TODD PACIFIC SHIPYARDS CORPORATION

4/15/03

Date

Signature: [Signature]  
Name (print): S. G. WELCH  
Title: CEO  
Address: 1801 16<sup>th</sup> AVE SW  
SEATTLE WA 98134

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name (print): Michael G MARSH  
Title: SECRETARY : GENERAL COUNSEL  
Address: TODD SHIPYARDS CORPORATION  
1801 16<sup>th</sup> AVE SW  
SEATTLE WA 98134  
Ph. Number: 206.442.8501

## APPENDIX A

**STATEMENT OF WORK  
REMEDIAL ACTION & LONG-TERM MONITORING**

**TODD SHIPYARD SEDIMENT OPERABLE UNIT  
HARBOR ISLAND SUPERFUND SITE  
SEATTLE, WASHINGTON**

- I. PURPOSE
- II. PERFORMANCE STANDARDS
  - A. Cap Requirements
  - B. Dredge and Disposal Requirements
  - C. Subsurface Contamination
  - D. Marine Habitat
- III. WORK TO BE PERFORMED
  - A. Remedial Action Work Plan
    - 1. Final Construction Quality Assurance Plan
    - 2. Final Water Quality Monitoring Plan
    - 3. Final Quality Assurance Project Plan
    - 4. Final Field Sampling Plan
    - 5. Final Health and Safety Plan
    - 6. Final Operation, Maintenance & Monitoring Plan
  - B. Remedial Action Construction
    - 1. Pre-construction Inspection and Meeting
    - 2. RA Progress Meetings
    - 3. Interim Construction Inspections and Reports
    - 4. Final Construction Inspection
    - 5. Remedial Action Completion Report
  - C. Performance Monitoring & Construction Quality Assurance
  - D. Operation, Maintenance & Monitoring
- IV. SCHEDULE OF DELIVERABLES

## **I. PURPOSE**

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of the remedial action at the Todd Shipyard Sediment Operable Unit (TSSOU) set forth in the Record of Decision (ROD)<sup>1</sup>, which was issued by the United States Environmental Protection Agency (U.S. EPA), Region 10 on November 27, 1996, for the Harbor Island Shipyard Sediments Operable Unit, Harbor Island Superfund Site and in two separate Explanation of Significant Differences (ESD) issued on December 27, 1999 and March 31, 2003. The 1999 ESD separated Todd Shipyard sediments and Lockheed Shipyard sediments into two separate operable units from the previous Shipyard Sediment Operable Unit and redefined the TSSOU. The 2003 ESD defines the remedial action for the under-pier sediments, based on additional information gathered during remedial design activities associated with the Todd Shipyard; establishes confirmational numbers characteristic of contamination present in the West Waterway for the purpose of further defining the TSSOU; adjusts the TSSOU based on the use of confirmational numbers; summarizes requirements for long-term operation, maintenance and monitoring; defines abrasive grit blast and identifies the method for disposal of contaminated sediments and waste.

In conducting work specified in this SOW, the Settling Defendant shall follow: the ROD as modified by the 1999 and 2003 TSSOU ESDs; approved remedial design documents; this SOW; the approved Remedial Action Work Plan; and, U.S. EPA Superfund Remedial Action Guidance and other relevant guidances in submitting deliverables for implementing the remedial action at the TSSOU of the Harbor Island Superfund Site. Implementation of this SOW shall result in achieving the TSSOU cleanup objectives.

## **II. PERFORMANCE STANDARDS**

The Settling Defendant shall adhere to the following performance standards for the implementation of the remedial action for TSSOU. These performance standards are consistent with the cleanup objectives and are necessary to ensure that the remedy is protective of human health and the environment, and complies with Applicable or Relevant and Appropriate Requirements (ARARs). Performance standards shall include cleanup standards, standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all ARARs set forth in the ROD and ESDs, approved remedial design documents and approved deliverables under this SOW.

---

1. At the time of the ROD, Todd and Lockheed Shipyard Sediment Operable Units were part of the Shipyards Sediments Operable Unit (SSOU). EPA created the Lockheed and Todd Shipyard Sediment Operable Units from the SSOU because they have different remedial issues that are better addressed as separate OUs.

## **A. Cap Requirements**

The Settling Defendant shall demonstrate that all capped areas are completed in accordance with site-specific requirements specified in approved remedial design, Construction Quality Assurance Plans (CQAP) and Operation, Monitoring and Maintenance Plan (OMMP). The methods for achieving the objectives for the capped areas will be set forth in the approved Draft Final (95%) Remedial Design Submittal package. Verification of performance standards shall be documented in the Construction Quality Assurance Plan (CQAP), and the Operations, Maintenance & Monitoring Plan (OMMP), as appropriate. As-builts shall be provided for the capped areas.

## **B. Dredge and Disposal Requirements**

The ROD states that: (1) all sediment exceeding the chemical contaminant screening level (CSL) of the State of Washington Sediment Management Standards (SMS) and shipyard waste be dredged and disposed of in an appropriate in-water or upland disposal facility, and (2) all sediments exceeding the sediment quality standards (SQS) of the SMS be capped with a minimum of 2 feet of clean sediment.

EPA has selected a remedy in which all contaminated sediments and shipyard waste in the open water areas of the TSSOU will be dredged to the lower SMS standard<sup>2</sup>, the SQS, for permanent removal. Dredged contaminated sediment shall be disposed of in an appropriate upland disposal facility as specified in approved design documents.

Performance standards for dredging shall be consistent with the ROD, ESDs and ARARs specified in the ROD. Under this SOW, TSSOU will be subject to long-term monitoring to ensure that the selected remedy remains protective. During in-water activities (e.g., capping or dredging) monitoring will be performed and compared to marine acute water quality standards or background concentrations and if necessary corrective actions will be taken to mitigate impacts to water quality.

As-builts of all dredged surfaces shall be provided to EPA in the Remedial Action Completion Report. The Settling Defendant shall document to EPA quantities of contaminated sediments and waste (in-place volumes), and disposal location for materials dredged from TSSOU. Verification that performance standards are achieved shall be documented in the Interim Construction Inspection Reports and the OMMP reporting, as appropriate.

---

2. The SMS does not provide a clean-up number for TBT, however, evaluation of existing core samples predicts that removal of all other chemicals of concern to meet SQS criteria will result in residual concentrations of TBT well below concentrations characteristic of the West Waterway.

### **C. Subsurface Contamination**

Exposure of contaminated subsurface sediments may occur during the cleanup by dredging adjacent areas, through physical processes, such as storms or ship scour, or through future dredging or excavation, etc. Therefore, the Settling Defendant shall implement the remedial action to ensure that contaminated subsurface sediment is not exposed and that the SQS are achieved at the final sediment surface, either by dredging to uncontaminated sediments, or by capping over dredge cuts where a contaminated subsurface may be exposed.

If any areas of the OU are not capped or dredged to the SQS but subsurface contamination is significant, long-term monitoring of these areas may be required under this SOW. In order for subsurface contamination to remain in place without monitoring, it must either be present at such low levels that it would not present a risk if it were exposed, or it must have a very low potential for exposure.

Under this SOW, the Settling Defendant shall conduct long-term monitoring in areas identified in the OMMP. If applicable, the long-term monitoring shall be designed to detect recontamination from buried subsurface contamination.

### **D. Marine Habitat**

The Settling Defendant shall take all appropriate measures during remedial design, construction, and site maintenance to avoid and minimize adverse impacts to the aquatic environment. Such measures include, but are not limited to, avoidance of fish-critical activity periods for in-water work, incorporation of remedial project measures or conservation measures into remedial and compensatory mitigation plans that protect ESA-listed species, or protect or restore critical salmonid habitat. Additionally, the Settling Defendant shall submit compensatory mitigation plans to offset unavoidable loss and other impacts to aquatic habitat and meet ESA responsibilities, as applicable. For capped areas, the Settling Defendant shall provide a capped surface that promotes colonization by aquatic organisms which may incorporate substrates beneficial to salmonids (e.g., "fish mix" or sand) as a final capping material.

## **III. WORK TO BE PERFORMED**

In November 1996, EPA issued a ROD that included the selection of a remedy for TSSOU. The July 1997 and April 2000 Administrative Orders on Consent (AOC) required the Settling Defendant to undertake remedial design activities for TSSOU. Under both AOCs, the Settling Defendant conducted sampling and analysis to further refine the extent of contamination, evaluated remedial strategies for implementing the remedy and determined that dredged sediments would be disposed at an acceptable upland disposal facility. In accordance with the AOCs, the Phase 1 Remedial Design Sampling and Analysis Report and the Phase 2 Remedial Design Sampling and Analysis

Report were submitted to EPA in January 1999, and in August 2001, respectively. In December 1999, EPA issued an ESD that redefined the TSSOU site boundaries and made TSSOU a separate operable unit the Lockheed Shipyard Sediments Operable Unit. A second ESD, issued in March 2003, mainly defined the selected remedial action for the under-pier areas and further adjusted the TSSOU.

Pursuant to the AOC, the following were scheduled to be submitted to EPA for review and approval: (1) Remedial Design Work Plan (including Sampling and Analysis Plan, and Quality Assurance Project Plan); (2) Remedial Design Data Report; (3) Source Control Report; (4) Conceptual Design Report as the Basis of Design Report; (5) Preliminary Design Report as the 30% Design Submittal package; (6) Draft Final 95% Design Submittal package; (7) Final (Contract) Construction Documents<sup>3</sup> as 100% Design Submittal package; (8) Operation and Maintenance Plan; (9) Construction Quality Assurance Plan; (10) Project Schedule; and (11) Cost Estimate.

This SOW requires the Settling Defendant to conduct RA according to the approved Draft Final (95%) Remedial Design Submittal and the Final (Contract) Construction Package. The scope of work for this remedial action includes the following key components:

- Removal of Piers 2 and 4S with replacement of Pier 4S;
- Dredging of contaminated materials and sediment in the open water areas;
- Installation of a cap, including marine habitat considerations in the under-pier areas;
- Demolition of side launch shipways at the northeast shoreline at facilitate cleanup dredging, and shipway replacement;
- Construction of source control actions including contaminated industrial stormwater rerouting and elimination of sandblast grit usage on dry dock #2;
- Disposal of contaminated dredge material and sediment; and
- Performance of long-term monitoring.

To accomplish this scope of work the remedial action shall consist of the following tasks:

A. Remedial Action Work Plan

1. Final Construction Quality Assurance Plan
2. Final Water Quality Monitoring Plan<sup>4</sup>
3. Final Quality Assurance Project Plans<sup>5</sup>

---

3. Final (Contract) Construction Documents includes design report, project plans and specifications.

4. For the TSSOU, the Water Quality Monitoring Plan will be packaged with the Field Sampling Plan in a Remedial Action Sampling and Analysis Plan and Quality Assurance Project Plans.

5. For the TSSOU, the Quality Assurance Project Plans will be packaged with the Remedial Action Sampling and Analysis Plan.

4. Final Field Sampling Plan<sup>6</sup>
  5. Final Remedial Action Health and Safety Plan
  6. Draft Final Operation, Maintenance and Monitoring Plan
- B. Remedial Action Construction
1. Pre-construction Inspection and Meeting
  2. RA Progress Meetings and Reports
  3. Interim Construction Inspections and Reports
  4. Final Construction Inspection
  5. Remedial Action Report
- C. Performance Monitoring and Construction Quality Assurance, and
- D. Long-term Operation, Maintenance & Monitoring

The Settling Defendant shall be responsible for implementing additional work elements necessary for successful implementation of the TSSOU remedial action. All documents, including work plans, reports, and memoranda, required under this SOW are subject to EPA review and approval. Unless otherwise specified by EPA, a draft version of each document shall be submitted to EPA for review and comment. All deliverables submitted in response to EPA's comments shall include a transmittal that responds directly to each comment, and identifies how the comment was addressed in the deliverable.

#### **A. Remedial Action Work Plan**

The Settling Defendant shall submit a Remedial Action Work Plan which includes a detailed description of the remediation and construction activities, including how those construction activities are to be implemented by the Settling Defendant and coordinated with EPA (e.g., site-monitoring, material staging and handling). The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the remedial action phase of the cleanup. The Settling Defendant shall submit a Remedial Action Work Plan in accordance with Section VI, Paragraph 9 of the Consent Decree and Section III.A. of this SOW.

The documents listed in this section must be prepared and submitted as outlined. The required contents of each of these documents is described below. The Settling Defendant shall submit the following deliverables with submission of the Remedial Action Work Plan (unless previously submitted and approved by EPA):

##### **1. Final Construction Quality Assurance Plan (CQAP)**

The Settling Defendant shall submit a Construction Quality Assurance Plan (CQAP) which describes the Site-specific components of the performance measurement methods and quality assurance program which shall ensure

---

6. For the TSSOU, the Field Sampling Plan will be packaged with the Water Quality Monitoring Plan in a Remedial Action Sampling and Analysis Plan and Quality Assurance Project Plans.

that the completed project meets or exceeds all performance standards and design criteria, plans, and specifications, including achievement of compliance with the SMS. The draft CQAP shall be submitted with the Pre-Final (95%) design submittal package and the final CQAP shall be submitted with the RA Work Plan. The CQAP shall contain, at a minimum, the following elements:

- a. Organizational structure, responsibilities and authorities of all organizations and key personnel involved in the design and construction of the remedial action, including EPA and other agencies.
- b. Qualifications. Establish the minimum training and experience of the Construction Quality Assurance (CQA) Official and supporting inspection personnel, and the necessary qualifications of the remedial construction contractor and any subcontractor(s), as appropriate.
- c. Performance Standards and Methods. Describe all performance standards and methods necessary to ensure implementation of the remedial action construction, including mitigation, in compliance with ARARs and identified site-specific performance standards. Performance monitoring requirements shall be stated to demonstrate that best management practices have been implemented for dredging operations; storage, handling, transportation and disposal of dredged material; transportation, handling, and storage of capping material; and proper cap placement techniques.
- d. Meetings. Establish requirements for scheduled meetings, including the preconstruction inspection and meeting, weekly progress meetings, work deficiency meetings, etc.
- e. Inspection and verification activities. Establish the observations and tests that will be required to monitor the construction and/or installation of the components of the remedial action. The plan shall include the scope and frequency of each type of inspection to be conducted. Inspections shall be required to measure compliance with environmental requirements and ensure compliance with all health and safety procedures.
- f. Sampling activities. Establish requirements for quality assurance sampling activities including the sampling protocols, sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports,

evaluation reports, acceptance reports, and final documentation. Establish a construction contingency plan which provides criteria for corrective action and includes a description and schedule of corrective actions to be implemented in the event that such criteria are exceeded during implementation of the remedial action.

g. Documentation. Reporting requirements for CQA activities shall be described in detail in the CQAP. This shall include procedures for updating and maintaining records such items as daily summary reports, inspection data sheets, health and safety reports, problem identification and corrective measures reports, activity logs, laboratory reports, emergency reports, chain of custody forms, maintenance and monitoring data, design acceptance reports, and final documentation. A description of the provisions for final storage of all records consistent with the requirements of the Consent Decree shall be included.

h. Field Changes. Describe procedures for processing design changes and securing EPA review and approval of such changes to ensure changes conform to performance standards, ARARs, requirements of this SOW, are consistent with Cleanup Objectives and are protective of human health and the environment.

i. Final Reporting. Identify all final CQAP documentation to be submitted to EPA in the Remedial Action Completion Report, or other deliverables and submissions.

## **2. Final Water Quality Monitoring Plan (w/ specific QAPP/FSP)**

Water quality monitoring must also be performed during dredging to measure contaminant release to the water and assure that the marine acute water quality criteria or background concentrations are not exceeded. For the TSSOU, the Water Quality Monitoring Plan will be packaged with the Field Sampling Plan in a Remedial Action Sampling and Analysis Plan and Quality Assurance Project Plan.

## **3. Final Quality Assurance Project Plan (QAPP)**

The Settling Defendant shall develop site-specific Quality Assurance Project Plans (QAPP), covering sample analysis and data handling for samples collected in all phases of future Site work, based upon the Consent Decree and guidance provided by EPA. The QAPPs shall be consistent with the requirements of the EPA Contract Lab Program (CLP) for laboratories outside the CLP. The QAPPs shall, at a minimum, include:

1. Project Description
  - Facility Location and History
  - Past Data Collection Activity
  - Project Scope
  - Sample Network Design
  - Sample size
  - Parameters to be Tested and Frequency
  - Project Schedule
2. Project Organization and Responsibility
  - Qualifications of the Quality Assurance Official to demonstrate that he/she possesses the training and experience necessary to fulfill his/her identified responsibilities
3. Data Management Plan
  - Describe tracking, sorting, retrieving data
  - Identify software for data storage,
  - Minimum data requirements & data format
  - Data backup procedures
  - Submission of data in format(s) acceptable to EPA
4. Quality Assurance Objective for Measurement Data
  - Level of Quality Control Effort
  - Accuracy, Precision, and Sensitivity of Analysis
  - Completeness, Representativeness, and Comparability
5. Sampling Procedures
6. Sample Custody
  - Field Specific Custody Procedures
  - Laboratory Chain-of-Custody Procedures
7. Calibration Procedures and Frequency
  - Field Instruments/Equipment
  - Laboratory Instruments
8. Analytical Procedures
  - Non-Contract Laboratory Program Analytical Methods
  - Field Screening and Analytical Protocol
  - Laboratory Procedures
9. Internal Quality Control Checks
  - Field Measurements

- Laboratory Analysis
- 10. Data Reduction, Validation, and Reporting
  - Data Reduction
  - Data Validation
  - Data Reporting
- 11. Performance and System Audits
  - Internal Audits of Field Activity
  - Internal Laboratory Audit
  - External Field Audit
  - External Laboratory Audit
- 12. Preventive Maintenance
  - Routine Preventive Maintenance Procedures and Schedules
  - Field Instruments/Equipment
  - Laboratory Instruments
- 13. Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness
  - Field Measurement Data
  - Laboratory Data
- 14. Corrective Action
  - Sample Collection/Field Measurement
  - Laboratory Analysis
- 15. Quality Assurance Reports to Management
  - Acceptance and rejection data sheets
  - Problem identification and corrective measure reports
  - Evaluation reports
  - Acceptance reports
  - Final documentation

The Settling Defendant shall submit a draft QAPP to EPA for review and approval. Final QAPPs, including any addenda, shall be revised in response to EPA comments. The initial QAPP shall be designed to encompass all phases of the project from the beginning of the remedial action/construction phase to confirmatory sampling, if possible. The initial QAPP shall specify all subsequent QAPP addenda anticipated for future project phases. The QAPPs should, at a minimum, address the following project elements as applicable: design sampling, PSDDA or DMMP sampling, upland disposal site sampling, construction monitoring sampling,

water quality monitoring sampling, long-term monitoring sampling, and mitigation sampling and other sampling requirements as needed. The Settling Defendant may update the pre-remedial design sampling plans (e.g., QAPP, FSP, HSP) previously prepared for the pre-remedial design effort completed to date and resubmit them for EPA's approval under this SOW.

#### **4. Final Field Sampling Plan**

The Settling Defendant shall develop a field sampling plan (as described in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", October 1988). The Field Sampling Plan should supplement the QAPP and address all sample collection activities. The Settling Defendant shall prepare a field sampling plan for all sampling to be conducted during RA. For the TSSOU, the Field Sampling Plan will be packaged with the Water Quality Monitoring Plan in a Remedial Action Sampling and Analysis Plan and Quality Assurance Project Plans.

#### **5. Final Remedial Action Health and Safety Plan**

The Settling Defendant shall develop a health and safety plan which is designed to protect on-site personnel and area residents and workers from physical, chemical, and all other hazards posed by this remedial action. The safety plan shall establish the performance levels and criteria necessary to address the following areas:

- Facility Description
- Personnel
- Levels of protection
- Safe work practices and safe guards
- Medical surveillance
- Personal and environmental air monitoring
- Personal protective equipment
- Personal hygiene
- Decontamination--personal and equipment
- Site work zones
- Contaminant control
- Contingency and emergency planning, including SPCC
- Logs, reports, and record keeping

The safety plan shall follow EPA guidance and all OSHA requirements as outlined in 29 C.F.R. 1910 and 1926. The Settling Defendant may utilize existing Health and Safety Plan project documents (e.g., Remedial Design Investigation HASP) or other company/contractor HASP provided that the

Settling Defendant demonstrates the HASP has been modified, as necessary, or otherwise sufficiently addresses the activities covered by this SOW.

## **6. Operation, Monitoring and Maintenance Plan (OMMP)<sup>7</sup>**

The Settling Defendant shall submit for EPA approval an Operation, Maintenance, & Monitoring Plan (OMMP). The objectives of the OMMP monitoring are to verify the continued long-term effectiveness of the remedy in protecting human health and the environment. This shall include:

- erosion monitoring by survey, video or other means of the under-pier caps, with contingencies for maintenance of the cap materials and potential sampling for chemicals of concern (COCs) in areas adjacent to the piers if erosion of cap materials has occurred;
- monitoring of stormwater source control actions<sup>8</sup> through documentation of compliance with NPDES requirements, and monitoring of potential NPDES system overflows for both NPDES and sediment chemicals of concern (COCs);
- monitoring of dry dock grit management source control actions<sup>9</sup> through documentation of compliance with NPDES requirements;
- establishing a schedule of inspections and monitoring;
- defining objective criteria for determining when maintenance is necessary; and
- defining objective criteria for determining whether design criteria and performance standards are being met, and establishing contingency actions to take to address thresholds or criteria that are exceeded such as stability of under-pier capping material.

The Settling Defendant shall prepare an OMMP to cover both implementation and long-term maintenance and monitoring of the remedial action, including mitigation areas if applicable. The Draft OMMP shall be

---

7. EPA may require monitoring of the open water areas to be conducted as part of Five Year Reviews. If chemical monitoring for COCs is performed in outer areas of the open water areas, results will be compared to the confirmational numbers listed in the 2003 ESD to determine whether recontamination has occurred at levels of concern.

8. Contingent on EPA's review and approval of the Source Control Report for TSSOU.

9. See Footnote 8.

submitted no later than with the 95% Design submittal package. The Draft Final OMMP shall be submitted to EPA no later than the Remedial Action Work Plan submittal. The Draft Final OMMP shall address all comments made to the draft OMMP and will be subject to EPA approval. After remedial action completion, the OMMP will be reviewed and revised, to produce a Final OMMP, under EPA direction and approval. The OMMP shall evaluate and include the following types of monitoring, as appropriate, to achieve the monitoring objective of each element of the remedial action:

- bathymetry
- sediment chemistry
- sediment bioassays

Other types of monitoring may also be identified during the development of the OMMP. The OMMP shall be composed of the following elements:

1. Description of normal operation and maintenance:
  - a. Description of tasks to achieve each monitoring objective;
  - b. Description of tasks for maintenance;
  - c. Schedule showing frequency of each OMMP task.
2. Description of routine monitoring and laboratory testing:
  - a. Description of monitoring tasks;
  - b. Description of data quality objectives.
  - c. Description of required data collection (including sample type, number, location and frequency, sampling equipment and methods), laboratory tests, and their interpretation;
  - d. Description of equipment, installation of monitoring components, maintenance of site equipment, and replacement schedule for equipment and installed components;
  - e. Required quality assurance and quality control, SAP, HSP, & FSP (or addenda);
  - f. Schedule of monitoring frequency
  - g. Schedule for reporting results;
  - h. If necessary, description of the monitoring necessary during implementation of habitat mitigation and after implementation to evaluate its success, if habitat mitigation is required.
3. Corrective Action:
  - a. Proposal for EPA approval of physical, chemical, or biological thresholds or criteria triggering corrective actions (based on routine monitoring results).
  - b. Description of proposed corrective action or anticipated remedies to be implemented in the event that these thresholds or criteria are

exceeded, or cleanup or performance standards are not met (e.g., if exceedances of Confirmational Numbers are detected).

- c. Identify additional sampling and/or analysis to be conducted to identify, to the maximum extent possible, the source of the contamination. If based on this analysis, EPA concurs that the source is from outside the boundaries of the TSSOU or not under the control of Settling Defendant and is not attributable to the Settling Defendant then corrective action by the Settling Defendant shall not be required;
- d. Schedule for implementing these corrective actions or anticipated remedies; and
- e. The corrective actions shall also address releases or threatened releases to the environment.

4. Description of procedures for a request to EPA to reduce the frequency of or discontinue monitoring.

5. Records and reporting mechanisms required:

- a. Laboratory records;
- b. Mechanisms for reporting emergencies;
- c. Personnel records;
- d. Maintenance records;
- e. Records of long-term monitoring costs;
- f. Documentation to comply with CERCLA 5-year Review Reporting Requirements; and
- g. Reports to State or Federal Agencies.

## **B. Remedial Action Construction**

The Settling Defendant shall implement the remedial action as detailed in the approved 100% Design Submittal package, i.e., final Construction (Contract) Documents and Final Remedial Action Work Plan. The following activities shall be completed in constructing the remedial action.

### **1. Pre-construction Inspection and Meeting**

The Settling Defendant shall participate with EPA in a preconstruction inspection and meeting to:

- 1. Review contract management, including methods for documenting and reporting inspection data, and compliance with specifications and plans including methods for processing design changes and securing EPA review and approval of such changes as necessary;

2. Review methods for distributing and storing documents and reports;
3. Review work area security and safety protocol;
4. Demonstrate construction management procedures are in place, and discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and
5. Address the following items:
  - Construction Schedule
  - Project Direction and Execution
  - Remedial Action Team
  - Water Quality Monitoring Plan (w/ specific QAPP/FSP) QAPP/H&S Plan/ FSP for remedial action construction activities
  - Materials Management Plan (if necessary)
  - Transportation and Disposal Plan (if necessary)
  - Community Health and Safety Plan (if necessary); and
6. Conduct a site visit to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The pre-construction inspection and meeting shall be documented by the Settling Defendant's designated contact and minutes (containing names of people in attendance issues discussed, clarifications made, special instructions issued, etc,) shall be transmitted to EPA within seven (7) working days of the inspection or meeting.

## **2. RA Progress Meetings**

The Settling Defendant shall conduct RA progress meetings on a regular basis throughout the RA. The meetings shall be held at least monthly unless a less frequent schedule is agreed to by EPA. At a minimum, the Settling Defendant shall address the following at progress meetings:

- General progress of construction with respect to RA schedule;
- Problems encountered and associated action items;

- Pending design, personnel or schedule changes requiring EPA review and approval;
- Results of any RA verification sampling and associated decisions and action items.

All progress meetings shall be documented by the Settling Defendant's designated contact and minutes (containing names of people in attendance issues discussed, clarifications made, special instructions issued, etc.) shall be transmitted to EPA within seven (7) working days of the inspection or meeting.

### **3. Interim Construction Inspections and Reports**

In-water construction activities are limited to specified time intervals throughout the calendar year, generally late summer to mid-February, because of concerns for endangered species such as salmon. Within thirty (30) days after completion of each annual in-water construction season, the Settling Defendant shall notify EPA for the purposes of conducting an interim construction inspection. Participants shall include the Settling Defendant's Project Manager, Consultants, and Construction Contractor(s); and EPA's Remedial Project Manager and Consultants; and other federal, state, and local agencies with jurisdictional interest.

The interim construction inspections shall consist of a walk-through inspection of the site, and/or a review of underwater video of other site cleanup areas, where necessary. The inspection is to review the status of Remedial Action construction, consistency with the Construction (Contract) Package and the Remedial Action Work Plan, compliance with the CQAP, field changes and change orders, and the status of performance monitoring results.

Within thirty (30) days of each interim construction inspection, an Interim Construction Inspection Report will be submitted to EPA. This report shall include both a summary of the major CQAP results and field changes, as well as detailed field notes from the inspection. The Interim Construction Inspection Report shall outline the incomplete or outstanding construction items, actions required and completion date for these items.

### **4. Final Construction Inspection**

Within thirty (30) days after all Remedial Action construction activities are complete and performance standards have been attained, the Settling Defendant shall notify EPA for the purposes of conducting a final construction inspection. The final inspection shall consist of a walk-through inspection by EPA and the Settling Defendant and/or a review of

underwater video of the other portions of the TSSOU where pertinent remedial construction activity occurred. The interim construction inspection reports shall be used as a checklist ("punch list") with the final inspection focusing on the outstanding construction items identified in the interim inspections. Confirmation shall be made that outstanding items have been resolved. Any outstanding items discovered during the inspection requiring correction shall be identified and noted.

Field notes from the inspection and resolution of all outstanding items should be documented in the Remedial Action Completion Report.

## **5. Remedial Action Completion Report**

The Settling Defendant shall follow EPA guidance for preparing Remedial Action Reports described in "Close Out Procedures for National Priorities List Sites", EPA 540-R-98-016, OSWER Directive 9320.2-09A-P, PB98-963223, January 2000, in submitting the Remedial Action Completion Report.

The Remedial Action Completion Report shall be submitted after construction is complete and all performance standards have been attained, but where OMMP requirements will continue to be performed. Within sixty (60) days of a successful demonstration that all performance standards have been attained, the Settling Defendant shall submit a Remedial Action Completion Report. EPA will review the draft report and will provide comments to the Settling Defendant.

In the report, a registered professional engineer and a responsible corporate official or the Settling Defendant' Project Coordinator shall state the remedial action has been completed in full satisfaction of the requirements of the Consent Decree. The written report shall include as-built drawings signed and stamped by a professional engineer, and other supporting documentation to demonstrate the CQAP was followed and verification that performance standards, including the cleanup objectives described in the ROD and ESDs, have been attained. The report shall contain the following statement, signed by a responsible corporate official of a the Settling Defendant or the Settling Defendant' Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

### **C. Performance Monitoring and Construction Quality Assurance**

Performance monitoring shall be conducted to ensure that all performance standards are met, including cleanup verification methods and methods for determining compliance with performance standards and ARARs. The CQAP addresses all performance standards related to the remedial action construction, including achieving compliance with the SQS.

### **D. Operation, Maintenance & Monitoring**

The purpose of this task is to perform the activities necessary to protect the integrity of the remedy and to evaluate system performance. Operational, maintenance and monitoring activities may include periodic inspection and maintenance of capped areas and source control measures, or any other periodic activity necessary to ensure the continued protection of public health or the environment. Operational, maintenance and monitoring activities are initiated after the remedy has achieved the remedial action objectives and the remediation goals of the ROD and ESDs, and is determined to be operational and functional. This task will begin with revision of the Draft Final OMMP based on actual remedial action implementation to produce a Final OMMP. Routine reports submitted to EPA shall summarize operational, maintenance and monitoring activities. Requirements and procedures for implementing operational, maintenance and monitoring activities are described in the OMMP.

## **IV. SCHEDULE OF DELIVERABLES**

The schedule for notification to EPA or submission of major deliverables to EPA is described below.

<b>#</b>	<b>Submission</b>	<b>Due Date</b>
1.	Notification for Remedial Action Start	Provide notification to EPA forty-five (45) days prior to initiation of fieldwork to allow EPA to coordinate field oversight activities.
2.	Remedial Action Work Plan incl. Final CQAP, Water Quality Monitoring Plan, Final QAPP/HSP/FSP, Draft Final OMMP	Concurrent with submission of the Construction (Contract) Documents to EPA, or August 1, 2003, which ever is later.
3.	Pre-Construction Inspection and Meeting	At least fourteen (14) days prior to Initiation of Remedial Action Construction.

4.	Initiate Construction of Remedial Action	Within thirty (30) days after approval of Remedial Action Work Plan, or within thirty (30) days after entry of the Remedial Action Consent Decree, or August 15, 2003, which ever is later.
5.	Interim Construction Inspection Reports	Within thirty (30) days of each interim construction inspection, or by April 15 of each construction year, which ever is later.
6.	Completion of Construction	April 15, 2006
7.	Final Construction Inspection	Within thirty (30) days after all Remedial Action construction activities are complete and performance standards have been attained.
8.	Remedial Action Completion Report	Within sixty (60) days following the final construction inspection and/or successful demonstration that all performance standards have been attained.
9.	Final OMMP	Within sixty (60) days following the final construction inspection and/or successful demonstration that all performance standards have been attained.

## APPENDIX B

**RECORD OF DECISION**

**DECLARATION, DECISION SUMMARY,  
AND RESPONSIVENESS SUMMARY  
FOR**

**THE SHIPYARD SEDIMENT OPERABLE UNIT,  
HARBOR ISLAND, SEATTLE, WASHINGTON**

**NOVEMBER 1996**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 SIXTH AVENUE  
SEATTLE, WASHINGTON**

*West Waterway*

SW FLORIDA ST.

Outfall F  
SW FLORIDA SD (106)

π 67335

RP-1

T-9

T-8

T-7

T-6

T-5

T-4

T-3

T-2

T-1

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I. Declaration	
II. Decision Summary	
A. Introduction .....	1
B. Site Name, Location and Description .....	1
C. Site History .....	3
D. Highlights of Community Participation .....	5
E. Scope and Role of Response Action .....	6
F. Summary of Site Characteristics .....	6
G. Summary of Risks for the Shipyard Sediment OU .....	16
H. Cleanup Objective and Sediment Standards .....	19
I. Description of Remedial Alternatives .....	21
J. Summary of the Comparative Analysis of Alternatives .....	25
K. The Selected Remedy .....	29
L. Statutory Determinations .....	35
M. Documentation of Significant Changes .....	40

## APPENDICIES

Appendix A: Responsiveness Summary

Appendix B: Alternative Cost Estimate Tables

Appendix C: Administrative Record Index

## **List of Figures**

Figure 1: Harbor Island Location Map .....	2
Figure 2: Harbor Island Site Map .....	4
Figure 3: Todd Shipyards Cleanup Area .....	7
Figure 4: Lockheed Shipyard Cleanup Area .....	8
Figure 5: Surface Sediment Sampling Locations .....	13

## **List of Tables**

Table 1: EBAP Sediment Contaminant Concentrations .....	14
Table 2: RI Sediment Contaminant Concentrations .....	14
Table 3: SRI Sediment Contaminant Concentrations .....	14
Table 4: Chemical Cleanup Standards .....	22
Table 5: Alternative Cost Estimates .....	28

## **DECLARATION**

### **SHIPYARD SEDIMENT OPERABLE UNIT, HARBOR ISLAND, SEATTLE, WASHINGTON**

#### **SITE NAME AND LOCATION**

Shipyard Sediment Operable Unit, Harbor Island

Seattle, King County, Washington

#### **STATEMENT OF BASIS AND PURPOSE**

The Harbor Island Superfund Site (Site) is located in Seattle, King County, Washington. The U.S. Environmental Protection Agency (EPA) has divided this Site into five operable units (OUs), which are: 1) the petroleum storage tank OU, 2) the Soil/Groundwater OU, 3) the Lockheed Shipyard OU, 4) the Shipyard Sediment OU, and 5) the Waterway Sediment OU. The Shipyard Sediment OU includes contaminated nearshore sediments at the Todd and Lockheed Shipyards. This Record of Decision (ROD) presents the selected remedial action for the Shipyard Sediment OU. This remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. §§ 9601-96), as amended, and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for the Shipyard Sediment OU which is available in EPA's Record Center, 7th Floor, 1200 Sixth Avenue, Seattle, Washington, 98101.

The Washington State Department of Ecology (Ecology) concurs with the selected remedy for the Shipyard Sediment OU.

#### **ASSESSMENT OF THE SITE**

Actual or threatened releases of hazardous substances from the Shipyard Sediment OU, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to human health and the environment.

#### **DESCRIPTION OF THE SELECTED REMEDY**

Based on CERCLA, the NCP, the Administrative Record, the comparative analysis of the alternatives, and public comment, EPA has selected Alternative 4, Dredge to the Chemical

Cleanup Screening Level (CSL) and Cap, as the remedy for the Harbor Island Shipyard Sediment OU. Alternative 3, Dredge to the Chemical Sediment Quality Standard (SQS), is identified as a contingent remedy if sediment sampling conducted during remedial design indicates that Alternative 3 provides a better cost-benefit than Alternative 4.

The essential elements of the selected remedy for the Shipyard Sediment OU are:

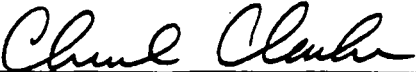
- 1) All sediments exceeding the chemical CSL and shipyard waste must be dredged. This also applies to sediments and shipyard waste in the shipways at Lockheed Shipyard. The extent of dredging of contaminated sediments and waste under piers at Todd and Lockheed Shipyards will be determined during remedial design based on cost, benefit, and technical feasibility;
- 2) Dredged sediments must be disposed in appropriate confined nearshore disposal (CND) or confined aquatic disposal (CAD) facilities. Appropriate CND or CAD sites will be selected during remedial design. If suitable CND or CAD sites are not identified, dredged sediments must be taken to an appropriate upland disposal facility. Any dredged material which is predominately shipyard waste must be disposed in a solid waste disposal facility. Sandblast grit may be recycled as feedstock for cement production;
- 3) After dredging, all remaining areas which exceed the chemical and/or biological SQS must be capped with a minimum two feet of clean sediment. The cap will meet the SQS cleanup objective by isolating remaining contaminants and preventing release of these contaminants to the environment. The cap is also intended to be protective of any future cleanup goals for TBT and PCB bioaccumulation by eliminating the exposure pathways associated with residual concentrations of these contaminants. The cap may require armoring with gravel or small rocks if analyses conducted during remedial design demonstrate that armoring is necessary;
- 4) Dredging and capping must be conducted with the objective of creating a flat surface out to the boundary of the Shipyard Sediment OU to minimize the potential for recontamination of the cap by resuspended contaminated sediments from other sources. Dredging, capping and disposal methods must also minimize adverse impacts to the existing habitat. In particular, the selected dredging and disposal methods shall minimize the release and resuspension of contaminated sediments to the environment. To the extent practicable, the marine habitat in the Shipyard Sediment OU must also be restored to its most productive condition; and
- 5) Long-term monitoring of contaminant concentrations in the cap, and monitoring of cap thickness, must be periodically conducted. Long-term maintenance of the cap, which involves adding supplemental clean sediment to the cap, must periodically be performed to maintain the cap at a minimum 2-foot thickness. Future maintenance dredging in the Shipyard Sediment OU would be allowed only if it maintains the protectiveness of the selected remedy.

The estimated volume of sediment to be dredged at Todd Shipyards is 116,000 cubic yards, and approximately 80,000 cubic yards of clean sand would be needed for the cap. The estimated volume to be dredged at Lockheed Shipyard is 18,000 cubic yards, and the estimated volume of clean sand required for the cap is about 11,000 cubic yards. The estimated cost of the selected remedy is based on the assumption that all dredged sediment can be placed in a CND facility. The estimated cost to design and implement this remedy at Todd Shipyards is \$4.5-6.9 Million (M), with an additional cost of about \$1.0 M for the first ten years of cap monitoring and maintenance after construction is complete. The estimated cost to design and implement this remedy at Lockheed Shipyard is \$1.5 M, with an additional cost of about \$0.5 M for the first ten years of cap monitoring and maintenance. It is estimated that it would take approximately 28-34 months to design and implement the selected remedy at Todd Shipyards, and 22-28 months to design and implement this remedy at Lockheed Shipyard.

### STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with state and federal requirements that are legally applicable or relevant and appropriate to the remedial actions, and is cost effective. This remedy uses permanent solutions to the maximum extent practicable. The statutory preference for treatment will be satisfied by evaluating during remedial design the technical feasibility, implementability, and cost-effectiveness of physical separation technologies to separate sandblast grit from dredged sediments.

Because this remedy will leave some hazardous substances on site above cleanup goals, a review of the site and its remedy will be conducted within five years after initiation of the remedial action to ensure the remedy continues to provide adequate protection of human health and the environment.

  
\_\_\_\_\_  
Chuck Clarke  
Regional Administrator, Region 10  
U.S. Environmental Protection Agency

11/27/96  
Date

**DECISION SUMMARY  
RECORD OF DECISION  
SHIPYARD SEDIMENT OPERABLE UNIT, HARBOR ISLAND,  
SEATTLE, WASHINGTON**

**A. INTRODUCTION**

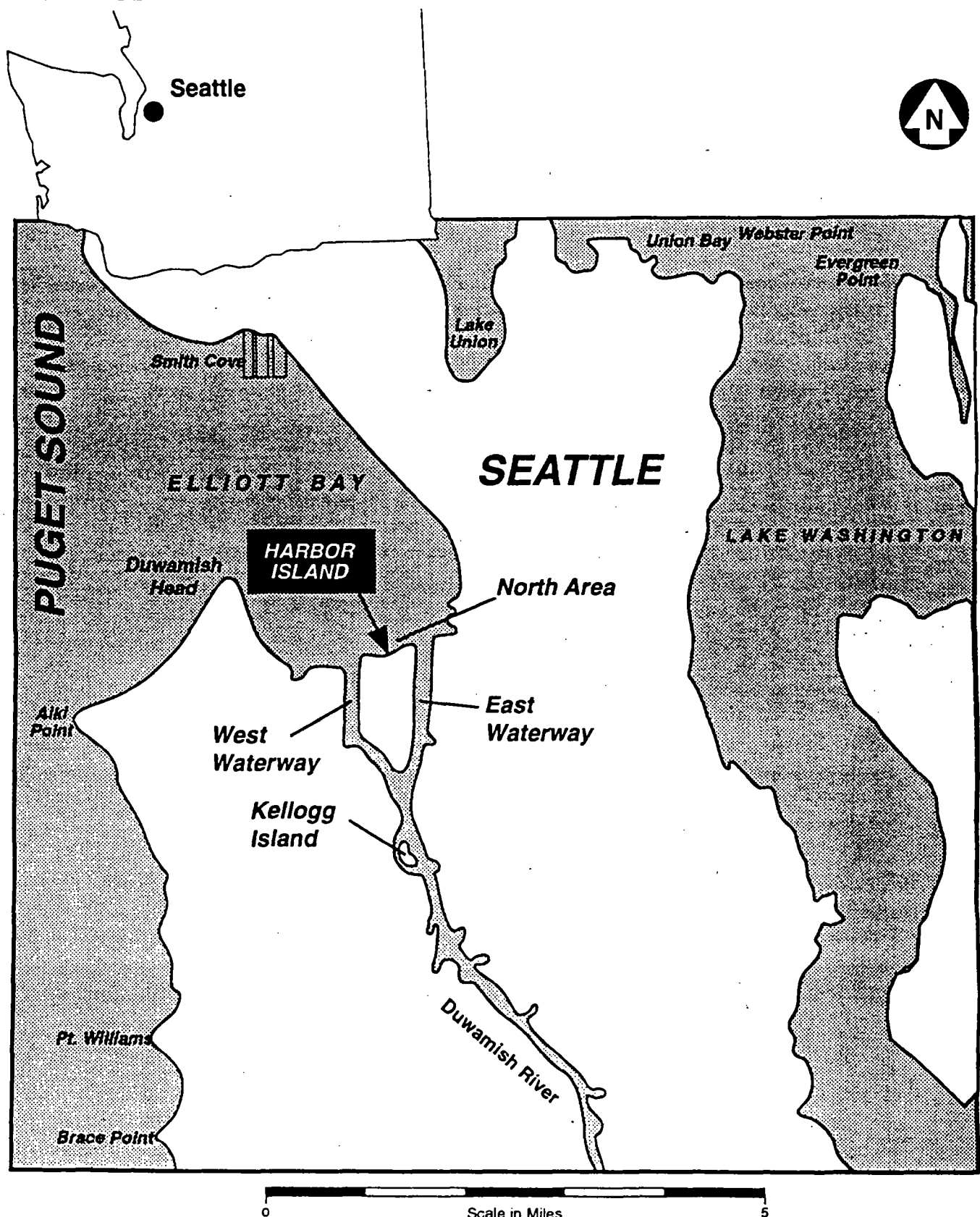
The Shipyard Sediment Operable Unit (OU) consists of nearshore sediments at the Todd and Lockheed Shipyards, which contain shipyard hazardous substances and wastes. The Shipyard Sediment OU is within the Harbor Island Superfund Site (Site), in Seattle, King County, Washington. The Site was listed on the National Priorities List (NPL) in 1983, due to the release of lead from a secondary lead smelter on the island, as well as the release of other hazardous substances from other industrial operations on the island. A Remedial Investigation (RI) and Feasibility Study (FS) of Harbor Island sediments was initiated by the United States Environmental Protection Agency (EPA) in 1991, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9604, as amended, (CERCLA).

The Site has been divided into five OUs: 1) the petroleum storage tank facilities OU, 2) the Soil/Groundwater OU, 3) the Lockheed Shipyard OU, 4) the Shipyard Sediment OU, and 5) the Waterway Sediment OU. EPA is the lead agency for the Lockheed, Shipyard Sediment, Waterway Sediment, and Soil/Groundwater OUs. A cleanup action was selected for the Soil/Groundwater OU in a Record of Decision (ROD) issued in September 1993. A cleanup action was subsequently selected for the Lockheed Shipyard OU in a ROD issued in June 1994. EPA intends to issue a ROD for the Waterway Sediment OU after further studying these sediments. This decision document addresses only the Shipyard Sediment OU.

EPA has designated the Washington Department of Ecology (Ecology) as the lead agency for the petroleum storage tank OU because the primary contaminant there is petroleum, which is excluded from CERCLA but is a specifically included hazardous substance under the State's Model Toxic Control Act (MTCA). A cleanup decision for the petroleum storage tank OU is expected to be made by Ecology in late 1996.

**B. SITE NAME, LOCATION, AND DESCRIPTION**

Harbor Island is located approximately one mile southwest of downtown Seattle, in King County, Washington, and lies at the mouth of the Duwamish River on the southern edge of Elliott Bay (Figure 1). The island is man-made and has been used for industrial purposes



## Vicinity Map

FIGURE  
1



JOB NUMBER: 4000-02-46-2110 DATE: August 1994

since about 1912. The island is approximately 430 acres in size and is bordered by the East Waterway and West Waterway of the Duwamish River and by Elliott Bay to the north. Major features of Harbor Island, including the locations of the Todd and Lockheed Shipyards, are shown in Figure 2.

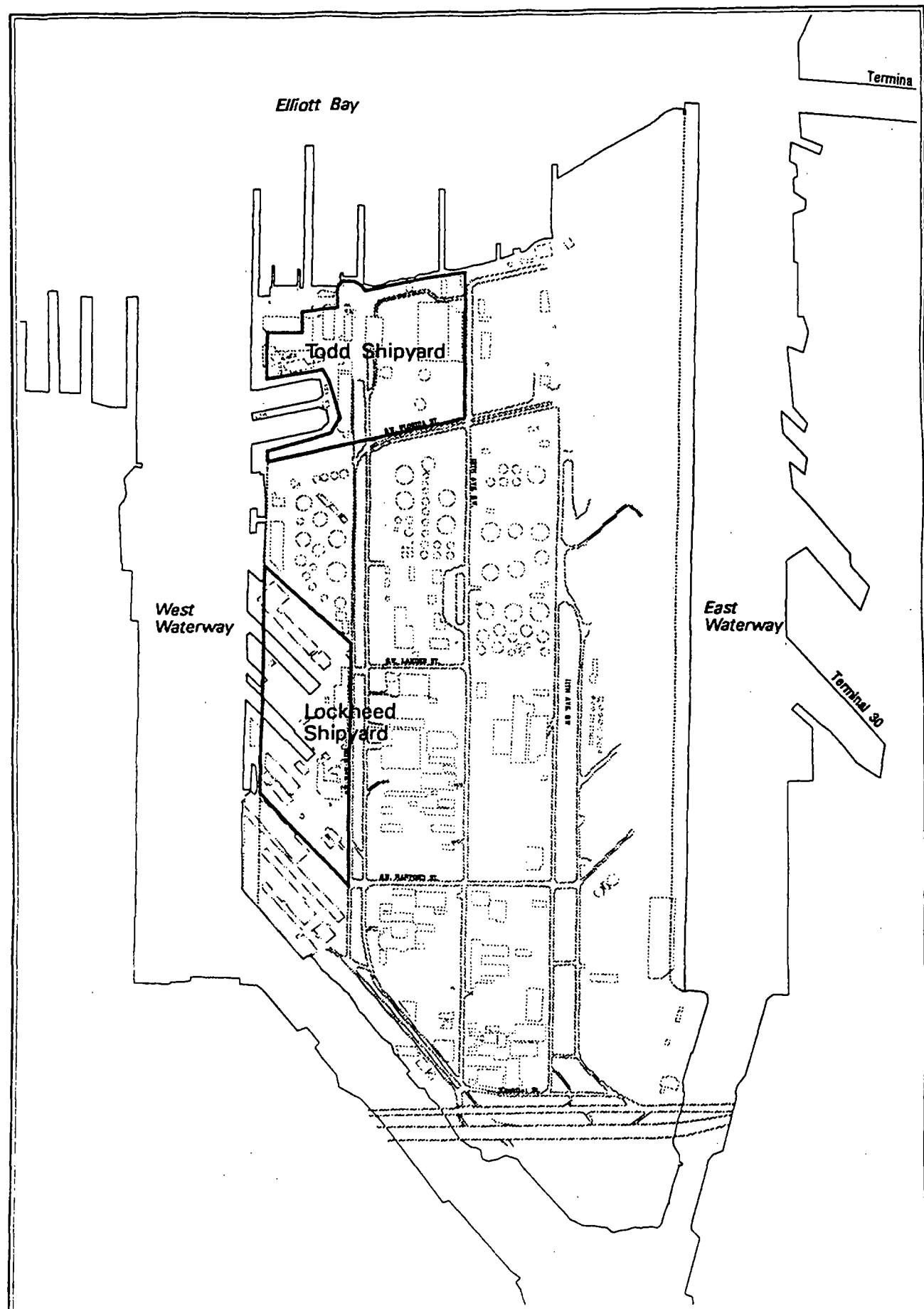
### C. SITE HISTORY

Prior to 1885, the area which is currently Harbor Island consisted of tideflats and a river mouth delta with some piling-supported structures. Initial construction of the island began between 1903 and 1905 when dredging of the East and West Waterways and the main navigational channel of the Duwamish River occurred. Dredged sediment was spread across the present island area to form a fill 5 to 15 feet thick. This dredged sediment was later covered with soil and demolition debris from Seattle regrade projects. Since its construction, the island has been used for commercial and industrial activities. Major activities have included ocean and rail transport operations, bulk petroleum storage and transfer, a secondary lead smelter, metal fabrication, and shipbuilding and repair. Warehouses, laboratories, and office buildings also have been located on the island.

Concern over the levels of lead in the air, due to the operation of the lead smelter, prompted several air monitoring studies during the 1970s. A study conducted in 1979 by the Puget Sound Air Pollution Control Agency (PSAPCA) showed that the quarterly average ambient air concentration of lead exceeded the federal standard for lead of  $1.5 \mu\text{g}/\text{m}^3$  95% of the time. Subsequently, a site inspection conducted by EPA in 1982 identified a significant volume of lead contaminated soil at the lead smelter facility. As a result of this site inspection, the island was listed on the National Priority List (NPL) in 1983.

In 1985, Ecology performed a preliminary investigation of the Site to further define the nature and extent of contamination on the island. This investigation, and subsequent investigations, revealed numerous types of contaminants in the soil including: cadmium, chromium, arsenic, copper, zinc, mercury, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and petroleum products. A summary of enforcement activities conducted by EPA in regard to cleanup actions for the Soil/Groundwater and Lockheed Shipyard OUs is provided in the RODs for these two OUs.

An initial investigation of marine sediments around Harbor Island was completed by EPA in 1988 as part of the Elliott Bay Action Program (EBAP). The nature and extent of contamination in Harbor Island sediments was characterized in an RI Report issued by EPA in September 1994. A Supplementary RI conducted by a group of Potentially Responsible Parties (PRPs) in 1995 further characterized the extent of chemical contamination in Harbor Island sediments and reported results of biological effects tests conducted on these sediments.



SCALE 1:11280  
250 0 250 500 750  
Feet



Harbor Island Site Map

## D. HIGHLIGHTS OF COMMUNITY PARTICIPATION

CERCLA requirements for public participation include releasing the RI and FS Reports and the Proposed Plan to the public and providing a public comment period on these documents. EPA met these requirements for the Shipyard Sediment OU by placing the RI, Supplementary RI, and FS Reports in the public information repository and issuing the Proposed Plan on October 31, 1995, to individuals on the mailing list. EPA published a notice of the release of the RI, FS, and Proposed Plan in the Seattle Times in the morning edition on November 3, 1995. Notice of the 60 day public comment period and the public meeting discussing the proposed plan were included in the newspaper notice. The public meeting was held on December 6, 1995, at the EPA Region 10 Office at 1200 Sixth Avenue, Seattle, WA. Public comments received are located in the Responsiveness Summary section of the ROD. The remedy selected in this ROD is based on the Administrative Record for this OU, which is located in the Record Center at EPA's Region 10 Office at 1200 Sixth Avenue, Seattle, WA.

To date, the most important community relations activities conducted by EPA at the Harbor Island site have been:

March 1988- EPA updated the 1985 Community Relations Plan.

December 1988- EPA released a fact sheet announcing the beginning of the Remedial Investigation.

November 1989- A fact sheet is released explaining the work being conducted by the City of Seattle to clean and sample the storm drain system on the island.

June 23, 1993- EPA releases the Proposed Plan for the cleanup of the Soil/Groundwater operable unit.

November 3, 1993- EPA releases fact sheet announcing cleanup decision for the Soil/Groundwater.

April 22, 1994- EPA releases a Proposed Plan summary fact sheet and the Proposed Plan for cleanup of the Lockheed Shipyard facility.

August 3, 1994- EPA releases fact sheet announcing cleanup decision for the Lockheed Shipyard.

January 4, 1995- EPA releases fact sheet announcing public comment period on the Lockheed Shipyard Consent Decree.

August 23, 1995- EPA issues fact sheet announcing public comment period on proposed amendment to the Soil/Groundwater ROD.

October 31, 1995- EPA releases the Proposed Plan for cleanup of the Shipyard Sediment OU.

November 3, 1995- Ad runs in the Seattle Times announcing the public comment period for the Shipyard Sediment OU.

December 6, 1995- Public meeting on the Shipyard Sediment OU Proposed Plan.

January 11, 1996- EPA issues fact sheet announcing public comment period on the Soil/Groundwater Consent Decree.

## **E. SCOPE AND ROLE OF RESPONSE ACTION WITHIN THE REMEDIAL STRATEGY**

Contaminated media at the Harbor Island Site consist primarily of soil, groundwater, petroleum products floating on groundwater, and sediments. The overall remedial strategy for the Site is to first remediate contaminant sources on Harbor Island, which include soil, groundwater, and floating petroleum products, before initiating sediment cleanup actions, because sources on the island could recontaminate cleaned sediments.

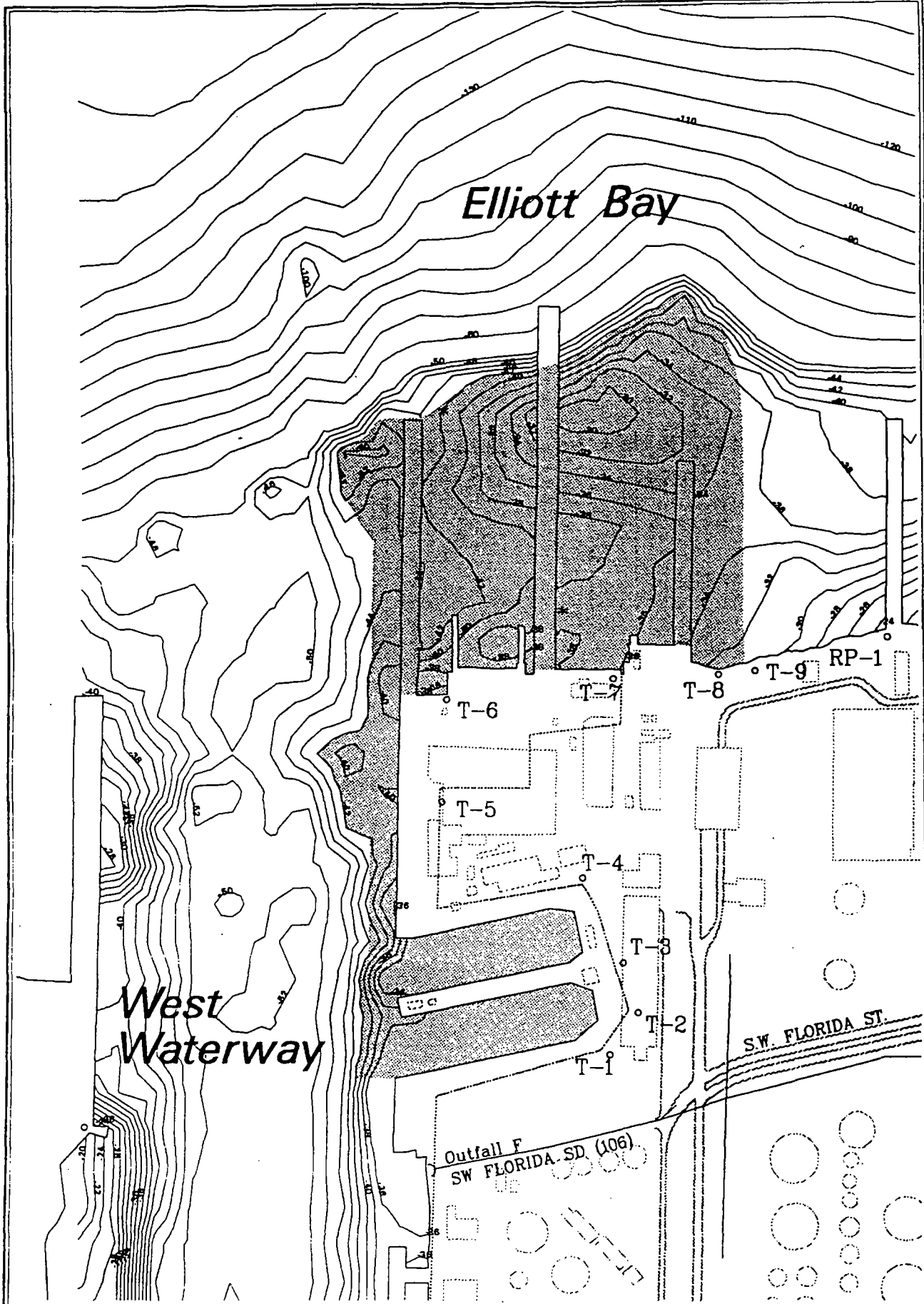
The Shipyard Sediment OU includes nearshore subtidal sediments at Todd Shipyards out to the edge of the steep slopes of Elliott Bay (to the north) and the West Waterway (to the west), which occur approximately at the minus 42 (-42) foot Mean Low Low Water (MLLW) contour, as shown in Figure 3. The Shipyard Sediment OU also includes nearshore subtidal sediments at Lockheed Shipyard out to the edge of the steep slope of the West Waterway, which occurs at approximately the minus 36 (-36) foot MLLW contour, as shown in Figure 4. These sediments are distinct from other contaminated sediments at Harbor Island because they are predominately contaminated with hazardous substances and shipyard wastes (primarily sandblast grit) released by shipbuilding and maintenance operations at Todd and Lockheed Shipyards. Hazardous substances released from these shipyards include copper, lead, mercury, tributyl tin (TBT), and zinc, which were additives to marine paints. The Shipyard Sediment OU is selected for the first Harbor Island sediment remedial action because: 1) sediments in this OU contain the highest concentrations of shipyard hazardous substances, and 2) hazardous substances in this OU likely are a source of contamination to other sediments around Harbor Island.

The remedial action selected in this ROD only addresses contaminated sediment in the Shipyard Sediment OU. The remedial action selected in this ROD is intended to be the final remedy for the Shipyard Sediment OU. EPA intends to further study the remaining contaminated sediments around Harbor Island to determine if additional remedial actions are required on these sediments. Any actions required for sediments outside of the Shipyard Sediment OU will be addressed in a future ROD.

## **F. SUMMARY OF SITE CHARACTERISTICS**

### **1. Physical Characteristics of the Duwamish River**

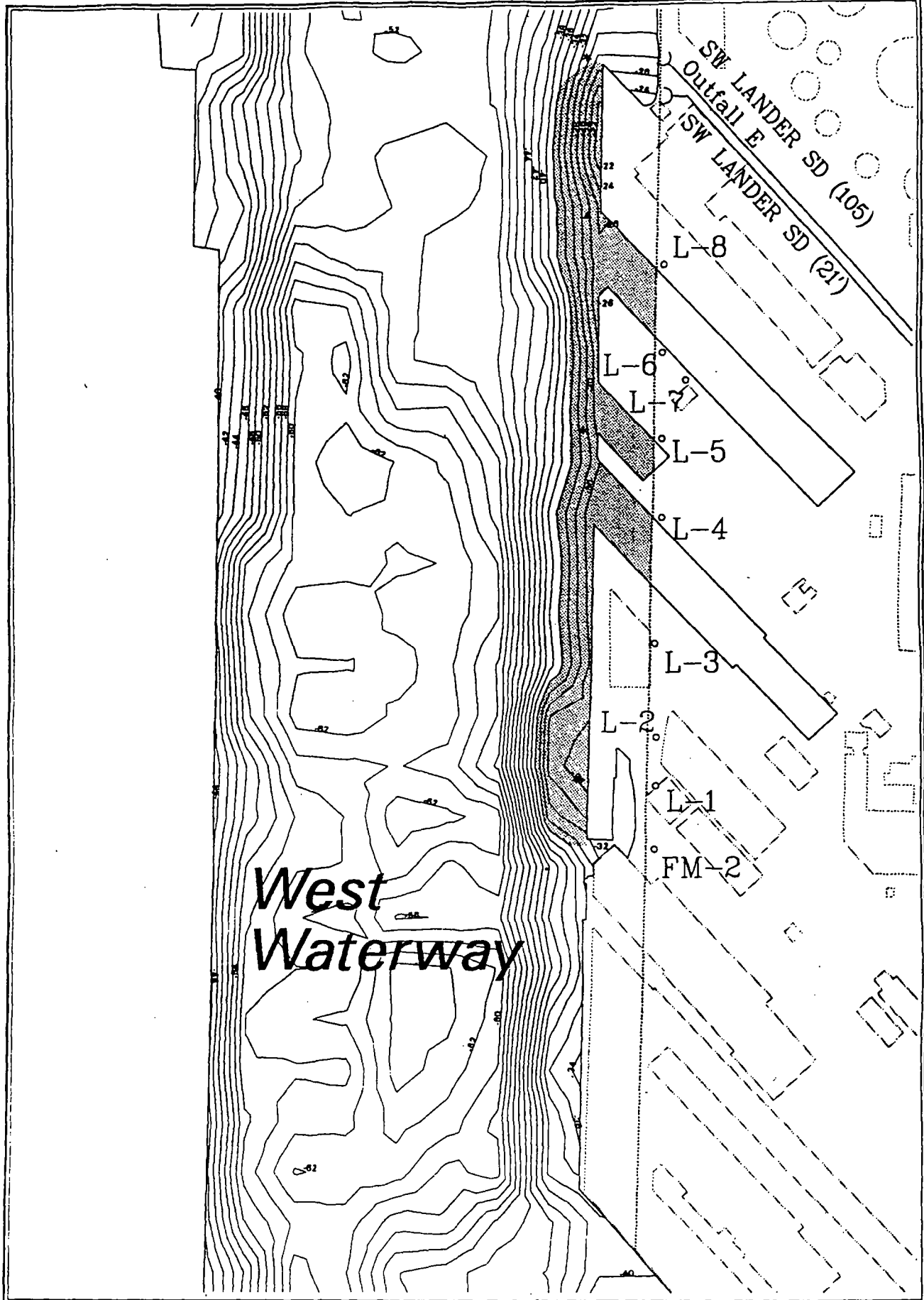
Harbor Island is situated in a geographic area known as the Puget Lowlands, a trough





Areas to be Remediated  
Contour in Feet



Todd Shipyard  
Cleanup Area



 Areas to be Remediated  
 Contour in Feet



Lockheed Shipyard  
Cleanup Area

characterized by low relief, with glacially shaped bluffs and low rising hills, and a vast area of intertidal and tidal flats. Harbor Island is located on the former delta of the Duwamish River, which flows into Elliott Bay and Puget Sound from the Duwamish-Green River valley. The historical drainage basin of the Duwamish River was approximately 300 percent greater than it is today, prior to modifications of the river channel morphology and flow. Discharges prior to the mid-1800s have been estimated at 2,500 to 9,000 cfs, in contrast to the present average of flow of 1,500 to 1,800 cfs. The sediment of the Duwamish River typically consists of slightly sandy silt with variable to abundant organic detritus (e.g., wood fragments). The bottom sediment in the East and West Waterways is dark brown to black and is characterized as slightly sandy silt in low-flow summer months, and as silty fine sand during high-flow months. Tidal influence in the lower river alters density gradients and river flows, affecting the settlement and movement of sediment in the river. Because of this tidal influence, approximately 80 percent of the Duwamish River suspended sediment load is deposited upstream of Harbor Island. A portion of the remaining sediment is deposited in the nearshore areas of the East and West Waterways, and in the Kellogg Island area, which is about 2 km upstream of Harbor Island.

Transport of suspended and bed sediment in the lower Duwamish River appears to be a function of complex riverine and estuarine processes. River flows and sediment loads (both suspended and bedload) from upstream sources vary seasonally. The amount of natural sediment supplied to the river from upland sources has been limited by anthropogenic changes to the river, including dam construction and shoreline stabilization. The sediment supply to the waterways is further depleted by the periodic maintenance dredging of bed sediment from the turning basin (upriver of Harbor Island), as well as construction of an upriver sediment trap by the Corps.

Although volumes are postulated to be small by comparison, some of the fine-grained muds around Harbor Island are supplied by transport processes in Elliott Bay that carry bed material into the Duwamish River estuary. Evidence exists for seasonal transport and deposition of Elliott Bay sediment upriver as far as the turning basin.

## **2. Ecological Characteristics of the Shipyard Sediment OU**

### **a. Intertidal and Subtidal Habitat**

The aquatic environment surrounding Harbor Island is part of the ecologically important Duwamish River estuary. In the last century, development and dredging have severely reduced intertidal habitats in Elliott Bay and the Duwamish River estuary. Prior to 1895, Elliott Bay included approximately 2,091 acres of intertidal sand and mudflats. This area has been reduced to 54.1 acres through filling, dredging, and bulkheading, eliminating most shallow intertidal habitats. The present shoreline of Harbor Island is generally composed of riprap, pier aprons, or sheet piling.

The Shipyard Sediment OU is mostly a shallow subtidal habitat, with a small amount of intertidal habitat. Sediment in this area reflects riverine inputs as well as intrusion of bay sediment. The natural sediment in the Shipyard Sediment OU is composed of organic detritus and sand which is dark brown to black. The shallow subtidal habitat within the slips of Todd

Shipyards is regularly disturbed by propeller wash, which disrupt colonization and succession of benthic and epibenthic organisms.

#### **b. Intertidal and Shallow Subtidal Biota**

The intertidal and subtidal habitat of the Shipyard Sediment OU supports diverse biota, including polychaetes, bivalves, gastropods, ostracods, and amphipods. In general, subtidal macroinvertebrate populations show weak seasonal trends with peaks in abundances in summer and early fall. Stress-tolerant species were found to be abundant in sediment samples collected from the shipyard sediments during the EBAP investigation. Such species are able to adapt to organic enrichment, changes in salinity, physical disturbance, and chemical contamination. In general, high silt and clay content in the sediment and periodic fast currents tend to preclude long-term stable populations of infaunal filter-feeding species. Deposit-feeding polychaetes, including the cirratulid *Tharyx multifilis* and members of the families Capitellidae, Maldanidae, Spionidae, and Paraonidae, tend to be numerically dominant. The most abundant clam species are *Axinopsida serricata* and *Macoma carlottensis*.

#### **c. Fish**

The Duwamish estuary is home to migratory and resident fishes. Elliott Bay and the Duwamish River serve as a migratory route and nursery for coho, chinook, and chum salmon. The estuary also provides an important osmoregulatory transition zone for out-migrating juvenile anadromous fish (e.g., salmonids). Steelhead, cutthroat trout, and Dolly Varden are the most abundant species to use the Duwamish estuary as a migratory route. The most abundant resident fish are Pacific herring, shiner perch, and several demersal species, including English sole, Pacific staghorn sculpin, and starry flounder. Twenty nine resident and seasonal species of demersal fish have been observed in the Duwamish estuary.

#### **d. Marine Mammals**

The most common sightings of marine mammals within Elliott Bay are of the harbor seal, California sea lion, and the harbor porpoise. Little information exists regarding marine mammal use of the lower Duwamish River, although there have been sightings of marine mammals in the estuary. Elliott Bay primarily serves as an adult foraging area. It is assumed that the lower Duwamish River would serve a similar function.

#### **e. Avian Species**

The small amount of intertidal habitat in the Shipyard Sediment OU may be occasionally used by aquatic birds and shore birds. Such aquatic birds may include a number of summer resident or migratory species of dabbling or diving birds (e.g., horned grebe, hooded merganser, gadwall, wigeon, common murre). Shore birds may include dowitcher, dunlin, yellowlegs, and sandpipers.

### 3. Contamination Sources for the Shipyard Sediments

Sources of contamination on Harbor Island which have potentially contaminated sediments in the Shipyard Sediment OU include: public and private storm drains, non-point surface runoff from contaminated soil, direct waste disposal, floating petroleum product on groundwater, and contaminated groundwater.

Public storm drains on Harbor Island, owned by the City of Seattle, were cleaned by the City in 1990 and are no longer considered to be a significant source of contamination to sediments. Private storm drains on Harbor Island, some of which release permitted industrial discharges (treated and untreated industrial process wastewater) to the surface water, were sampled in 1993 by EPA and were found not to contain significant contaminant concentrations. These private storm drains are therefore not considered to be significant sources of contamination to sediments.

In the past, contaminated surface soil on Harbor Island has been a significant non-point source to storm drains and surface water. Paving of exposed soil areas over the past two decades by the City and other entities has caused some reduction in the amount of contaminated surface runoff. It is expected that the remedies selected for the Soil/Groundwater and Lockheed Shipyard OUs, which require treatment of petroleum hot spot soil and asphalt paving for soil contaminated above cleanup levels, will eliminate the further release of contamination to surface runoff from both of these OUs.

Contamination groundwater from most of the island, except at Todd Shipyards and the petroleum storage tank OU, have been found to be insignificant. However, floating petroleum product and associated contaminated groundwater at Todd Shipyards is considered to be a source of contamination to sediments at the north end of Harbor Island. This source should be adequately controlled when the remedy selected in the ROD for the Soil/Groundwater OU, which requires pumping and treating floating product and associated contaminated groundwater at Todd Shipyards, is implemented.

Shipbuilding and ship maintenance activities at Todd and Lockheed Shipyards on Harbor Island have resulted in the direct disposal of waste into sediments adjacent to these shipyards. Much of the waste is believed to have originated from sandblasting, which is the process used to remove paint and paint preparations containing copper, lead, mercury, zinc, and TBT. Todd Shipyards has been an active facility since about 1918 and the Lockheed Shipyard began operating in the mid-1930's. Direct discharge of waste is no longer an issue at the Lockheed Shipyard because it is not an active shipyard. It is intended that direct discharge of waste at Todd Shipyards will be eliminated through best management practices, as defined by Washington State solid waste regulations, before the shipyard sediment remedy is implemented.

#### 4. Summary of the Nature and Extent of Contamination

Three independent investigations of Harbor Island sediments have been conducted. The first was conducted in 1986 during the EBAP, the second in 1991 during the RI, and a third in 1995 during a Supplementary Remedial Investigation. Surface sediment locations sampled during the EBAP investigation, the RI, and the SRI are all shown in Figure 5. During the EBAP investigation, contaminants and areas of concern were determined based on exceedance of Puget Sound Apparent Effects Thresholds (AET). An AET is the contaminant concentration in sediment above which specific adverse biological effects have always been observed in Puget Sound studies. Generally, for any one contaminant, different benthic organisms demonstrate biological responses at different concentrations, leading to a range of AETs (e.g., for benthic abundance, amphipod acute toxicity, oyster larvae acute toxicity, and microtox responses). In this investigation, most sediments sampled at Harbor Island exceeded the lowest AET (LAET). Contaminants which were frequently found to exceed the LAET value throughout the entire study area were arsenic, copper, lead, mercury, zinc, polychlorinated biphenyls (PCBs), low molecular weight polynuclear aromatic hydrocarbons (LPAHs), and high molecular weight polynuclear aromatic hydrocarbons (HPAHs).

The EBAP investigation found the highest concentrations of copper, lead, mercury, and zinc, in nearshore sediments at Todd and Lockheed Shipyards. These contaminants were used for many years in marine paints, and were found to be associated with sandblast grit released from the shipyards, further indicating that the shipyards were the major source of these contaminants found in the nearshore sediments. Other contaminants found in shipyard sediments and potentially associated with shipyard activities included PCBs and PAHs. The highest concentrations of contaminants found in two samples taken at Todd Shipyards, and in three samples taken at Lockheed Shipyards, and the comparison to the LAET value for each contaminant, are shown in Table 1.

In order to determine the acute and chronic toxicity to marine organisms of contaminants in Harbor Island sediments, the EBAP investigation also conducted sediment bioassays and determined the abundance of major benthic taxa in sediment samples. The results of these biological tests are summarized in the "Ecological Assessment" section of this ROD.

The RI of Harbor Island sediments was initiated by EPA in 1991. In this investigation surface (0-2 cm) sediment samples were collected from 96 locations and analyzed for contaminant concentrations. For the RI, the screening level used to identify contaminant concentrations of concern was the Sediment Quality Standard (SQS) of the Washington State Sediment Management Standards. The surface sediment samples collected during the RI indicated that contaminants exceeding the chemical SQS at Todd and Lockheed Shipyards were copper, mercury, PCBs, HPAHs, and LPAHs. The highest concentrations of these contaminants found at Todd (ten samples) and Lockheed Shipyards (six samples), and the comparison to the chemical SQS for each contaminant, are shown in Table 2. Since there is currently no cleanup standard for TBT, the highest TBT concentrations (as tin) found at the shipyards are compared to the Puget Sound Dredge Disposal Agencies (PSDDA) screening level.

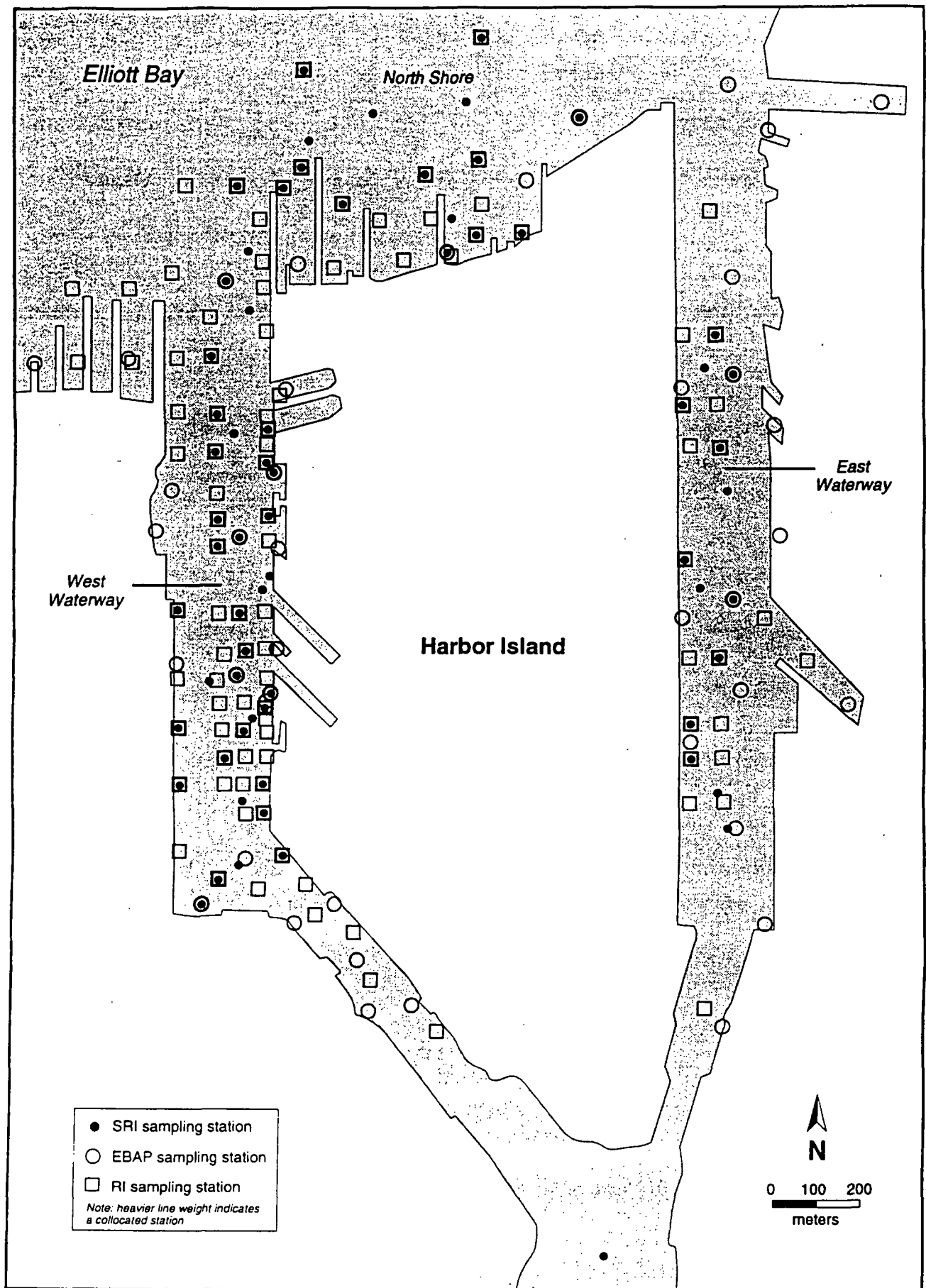


Figure 5. Locations of sediment sampling stations for the EBAP, RI, and SRI

TABLE 1

## EBAP Sediment Contaminant Concentrations (mg/kg, dry weight)

Contaminant (LAET)	Todd Shipyards	Lockheed Shipyard
Arsenic (85)	119	239
Copper (310)	2050	618
Lead (300)	550	1180
Mercury (0.41)	10	0.8
Zinc (260)	1300	1170
PCBs (0.13)	109	537
LPAHs (5.2)	273	316
HPAHs (12)	1674	1453

TABLE 2

## RI Contaminant Concentrations (mg/kg\*) Exceeding Chemical SQS

Contaminant (SQS)	Todd Shipyards	Lockheed Shipyard
Copper (390)	788	ne
Mercury (0.41)	4.2	0.47
TBT (0.03)**	35	0.99
PCBs (12)	141	14.6
LPAHs (370)	1928	ne
HPAHs (960)	8574	ne

TABLE 3

## SRI Contaminant Concentrations (mg/kg\*) Exceeding Chemical SQS

Contaminant (SQS)	Todd Shipyards	Lockheed Shipyard
Arsenic (57)	ne	99
Copper (390)	909	394
Lead (450)	ne	651
Mercury (0.41)	4.6	2.2
Zinc (410)	ne	1160
TBT (0.03)**	15	1.5
PCBs (12)	177	ne

\* Metals and TBT (as tin) are in dry weight, organics are organic-carbon normalized.

ne = no exceedance

\*\* The PSDDA Screening Level (mg/kg, dry weight)

In the RI, subsurface sediment samples were also collected to depths of 4 feet from 8 locations in nearshore areas of Harbor Island and analyzed for contaminant concentrations. Two of these subsurface cores were located at Todd Shipyards and two were located at the Lockheed Shipyard. In the subsurface samples taken at the shipyards, arsenic, copper, lead, mercury, and zinc exceeded their SQS levels at depths up to 4 feet below the surface. In fact, the concentrations of these contaminants in the subsurface at the shipyards actually increased with depth, reaching maximum concentrations at depths of 3 or 4 feet below the surface. These data indicate that copper, lead, mercury, and zinc were released in greater quantities prior to the mid-1980s when the shipyards began implementing controls to reduce the release of sandblast grit to the environment.

In February 1995, subsequent to completion of EPA's remedial investigation, a group of potentially responsible parties (PRPs), under an Administrative Order issued by EPA, conducted a Supplementary Remedial Investigation (SRI) of Harbor Island sediments to verify contaminant concentrations in these sediments and to determine if these contaminants are causing adverse biological effects in benthic organisms. In this investigation, surface (0-10 cm) sediment samples were collected from a total of 61 locations around the island, including ten samples collected within the Shipyard Sediment OU. The results of this investigation showed that contaminants exceeding the chemical SQS at Todd and Lockheed Shipyards were arsenic, copper, lead, mercury, zinc, and PCBs. The highest concentrations of these contaminants found during the SRI at Todd and Lockheed Shipyards, and the comparison to the chemical SQS for each contaminant, are shown in Table 3.

During the SRI, biological effects tests (bioassays) were conducted on sediment samples collected from 35 stations around Harbor Island. However, the PRPs elected to conduct bioassays on sediments from only three stations at Todd Shipyards and three stations at Lockheed Shipyard within the Shipyard Sediment OU. The results of these bioassays are summarized in the "Ecological Assessment" section of this ROD.

## **5. Routes of Potential Contaminant Migration in Sediments**

Harbor Island shipyard contaminants (copper, lead, mercury, TBT, zinc, PAHs, and PCBs) all have high affinity for sediment and organic matter found in sediment. However, these contaminants also bind to suspended particulates and dissolved organic macromolecules. Depending on the physical and chemical properties of each contaminant, they are also dissolved in water to a small degree.

When bound to suspended particulates or dissolved in water, these contaminants can be transported away from the site in the water column. The ultimate fate of contaminants are dependent on the rate of freshwater flow in the Duwamish River and tidal exchange with Elliott Bay. Under conditions of low flow (i.e., during the summer months), the majority of the suspended particulate matter leaving Harbor Island settles into the sediment in the East and West Waterways. However, during months of heavy rainfall, a large fraction of the particulates is transported in a buoyant plume to Elliott Bay, where settlement likely takes place.

Sediment-bound contaminants are also transported as bedload, driven by both tidal movement within the salt wedge, and riverine flows. Mobile bottom sediment tends to settle out in areas of null current (i.e., the vicinity of the toe of the salt wedge). Under conditions of low flow, this process could cause bedload sediment around Harbor Island to be transported several miles up the Duwamish River. Under higher flow conditions, deposition of bedload sediment extends out into Elliott Bay. The ultimate sink for bedload sediment may be the submarine canyon that connects to the central Puget Sound basin.

## G. SUMMARY OF RISKS FOR THE SHIPYARD SEDIMENT OU

### 1. Ecological Assessment

#### Evidence of Historical Biological Impacts

Biological effects data were collected at stations around Harbor Island during the EBAP study in 1986. In this study, sediment acute toxicity was determined using the amphipod *Rhepoxynius abronius*, and chronic toxicity was determined by observing the abundance of three major benthic taxa, *polychaeta*, *crustacea*, and *mollusca* (measured as abundance of *pelecypoda* and *gastropoda*). At one station (NH-03) located near the shoreline on the north side of Todd Shipyards, the mean amphipod mortality was 94%, which was significantly higher than mortality measured at the reference station and was the highest mortality measured at any Harbor Island station. Since the amphipod mortality for NH-03 was 30% higher than the reference station, this station fails the biological CSL of the Sediment Management Standards. At this station *gastropods* were depressed by 94% relative to the reference station, *pelecypods* were depressed by 87%, and *crustaceans* were depressed by 77%. Since the benthic abundance for NH-03 was significantly different from the reference station and depressed by greater than 50% for two major benthic taxa, this station also fails the biological CSL for benthic abundance. At another EBAP station (WW-19) located near the shore on the west side of Todd Shipyards, there was a significant depression in *pelecypods* and *crustaceans*. At this station *pelecypods* were depressed by 93% relative to the reference station, and *crustaceans* were depressed by 65%. Since the benthic abundance for WW-19 was depressed by greater than 50% for two major benthic taxa, this station fails the biological CSL for benthic abundance.

Biological effects were also measured at three sediment stations located near the shoreline at the Lockheed Shipyard (WW-09, WW-11, and WW-12) during the EBAP investigation. At these stations the mean amphipod mortality was 60%, 41%, and 33%, respectively. The amphipod mortality for stations WW-09 and WW-11 was significantly higher ( $P < .05$ ) than the reference station, and the mortality at station WW-09 was more than 30% higher than the reference station, which is a failure of the biological CSL. The abundance of *pelecypods* each at WW-09, WW-11, and WW-12 was depressed 85%, 90%, and 57%, respectively, relative to the abundance at the reference station. Since the abundance of *pelecypods* at each of these three stations was significantly different and depressed by more than 50% relative to the reference station, these stations fail the biological SQS for benthic abundance. The abundance of *crustaceans* at WW-12 was also significantly different and depressed 81% relative to the abundance at the reference station. Since the abundance of two major benthic taxa was

depressed by more than 50% at station WW-12, this station also fails the biological CSL for benthic abundance.

### **Evidence of Ongoing Biological Impacts**

A mussel bioaccumulation study conducted during the RI demonstrated that bioaccumulation of contaminants and adverse biological effects occurred in mussels placed at stations located near the shoreline at Todd and Lockheed Shipyards. Caged mussels were suspended 1 meter above contaminated sediments for 80 days at 12 nearshore locations at Harbor Island, including at Todd and Lockheed Shipyards. The results of this study demonstrated that the highest bioaccumulation of copper and zinc, and the second highest bioaccumulation of TBT, occurred at a station located at Todd Shipyards. The slowest juvenile mussel growth rates also occurred at this station. Relative to the reference station, high bioaccumulations of copper, lead, and TBT, occurred at a station next to the Lockheed Shipyard in the West Waterway, and a significant decrease in mussel growth rates also occurred at this station. This study indicates that contaminants in the shipyard sediments bioaccumulate in mussels and are associated with adverse biological effects in these organisms.

Two acute and one chronic biological tests (bioassays), according to the requirements of the Sediment Management Standards, were conducted on sediments from six stations within the Shipyard Sediment OU during the SRI. Of these six stations, three (NS-09,-10,-14) were located in nearshore sediments at Todd Shipyards, and the other three (WW-12,-13,-18) were located in nearshore sediments at Lockheed Shipyard. Two of the stations (NS-09 and NS-14) at Todd Shipyards failed the biological SQS for juvenile polychaete growth in *Neanthes arenaceodentata*. One of the stations (WW-12) at the Lockheed Shipyard also failed the biological SQS for mortality/abnormality in the bivalve *Mytilus galloprovincialis*.

## **2. Human Health Risk Due to Consumption of Seafood**

A 1988 EPA report titled, "Health Risk Assessment of Chemical Contamination in Puget Sound Seafood", which was based on data collected during the EBAP study, evaluated the potential adverse human health effects associated with regular consumption of recreationally harvested seafood from Puget Sound. The most significant human health risk identified in this study was an elevated cancer risk due to high concentrations of PCBs in fish (English sole) captured in the Elliott Bay/Duwamish River area. Among the trawling locations sampled for English sole in this area, two of them were immediately adjacent to the Shipyard Sediment OU. While the results of this study are not specific to the Shipyard Sediment OU, it is likely that high concentrations of PCBs in sediment at Todd Shipyards contribute to the elevated cancer risk identified in this study.

### **Contaminant Screening**

The contaminants of concern for this seafood risk assessment were selected based on the following criteria: 1) high persistence in the aquatic environment, 2) high bioaccumulation potential, 3) high toxicity to humans, 4) known sources of contamination in the area, and 5) high concentrations in previous samples of seafood from the area. Contaminants of concern

identified in this study included: lead, cadmium, mercury, arsenic, HPAHs, PCBs, alpha-hexachlorohexane, and DDT.

## Exposure Assessment

Risks were estimated for a subsistence fisherman consuming average quantities of seafood (12.3 grams fish, 1.1 grams shellfish, and 0.029 grams seaweed per day), and high quantities of seafood (95.1 grams fish, 21.5 grams shellfish, and 20.3 grams seaweed per day).

Mean contaminant concentrations and the average consumption rates for various categories of seafood were used to estimate average lifetime doses for contaminants of concern. The upper 95 percent confidence limit of mean contaminant concentrations in seafood and the high consumption rates for seafood were used to estimate high lifetime doses for each contaminant.

## Toxicity Assessment

The dose-response variables used in this risk assessment were potency factors for carcinogens and reference dose (RfD) values for non-carcinogens. The carcinogenic potency factors used in this study were typically the upper 95 confidence limit of slope of the linearized multistage model. The RfDs used were the estimated single daily chemical intake rate which would cause no adverse health effects if ingested over a lifetime. Both carcinogenic potency factors and RfD values used in this assessment were taken from EPA's Integrated Risk Information System (IRIS), dated 1987.

## Risk Characterization

The average risk from consumption of Elliott Bay fish was found to be 3 in 10,000 ( $3.0\text{E-}04$ ), and high risk was found to be 4 in 1,000 ( $4.0\text{E-}3$ ). Both these risk levels exceed the acceptable excess cancer risk of 1 in 10,000 ( $1.0\text{E-}04$ ) identified in the National Contingency Plan (NCP). The risk levels for consumption of Elliott Bay fish were among the highest found anywhere in Puget Sound and were driven by the high concentrations of PCBs in fish caught in the upper Duwamish River and around Harbor Island. In particular, fish caught at trawling locations in the West Waterway and North Harbor Island area, immediately adjacent to Todd Shipyards, had tissue concentrations of PCBs which were among the highest in this study area. The mean concentrations of PCBs in fish tissue were 460 ug/kg for the West Waterway, and 350 ug/kg for the North Harbor Island area. In comparison, the mean concentration of PCBs in fish tissue at the reference station was 5.4 ug/kg.

Since English sole are migratory and feed over a large area during their lifetime, the results of this seafood risk assessment cannot be used to identify specific sediment sources responsible for the PCBs detected in English sole. However, it is likely that the high concentrations of PCBs in sediments at Todd Shipyards contribute to the elevated cancer risk identified in this study.

In addition to the seafood risk assessment, an additional human health exposure pathway was evaluated in the RI. This pathway, which was direct contact with and accidental ingestion of

contaminated sediment by tribal fishermen while pulling up fishing nets, was found to be an insignificant human health risk.

### **3. Uncertainty Analysis**

#### **a. Uncertainties in Analytical Data**

Uncertainties in analytical results directly influence uncertainties associated with final risk calculations. All analytical results, not only those flagged as "estimated" during the validation process, possess an inherent variability. This variability or uncertainty is dependent upon the sample matrix, analytical method, and the particular analytical laboratory performing the analysis. Homogeneous samples (i.e., sediment with uniform grain size and water content) typically exhibit higher precision than relatively heterogeneous sediment.

A variability of minus 50 to plus 100 percent is not unreasonable for samples containing contaminants at concentrations less than the contract-required quantitation limit. For samples containing higher concentrations of contaminants, relative percentage differences between duplicates of 35 percent for sediment are considered acceptable.

#### **b. Toxicity-Related Assumptions**

The major site-specific uncertainty relating to potential human health risks pertains to the carcinogenicity of PCBs. The cancer slope factor for all PCBs is derived from a chronic rodent bioassay of Aroclor-1260. However, the highly chlorinated PCB mixtures such as Aroclor-1260 are more potent than the lower chlorinated mixtures (e.g., Aroclors 1254 and 1248). Consequently, using the slope factor for Aroclor-1260 to evaluate Aroclors 1248 and 1254 is expected to overestimate the excess cancer risk estimates associated with these lower chlorinated PCBs. The EBAP and RI studies referenced in this ROD measured only total PCBs, and did not determine concentrations of individual PCB Aroclors in sediment or fish tissue.

## **H. CLEANUP OBJECTIVE AND SEDIMENT CLEANUP STANDARDS**

The Shipyard Sediment OU includes nearshore sediments at Todd and Lockheed Shipyards which contain hazardous substances and shipyard waste (primarily sandblast grit) released from these shipyards. Shipyard hazardous substances include: copper, lead, mercury, TBT, and zinc, which were additives to marine paints used at the shipyards. Other hazardous substances potentially associated with shipyard activities include PCBs and PAHs. Evidence for adverse effects in benthic organisms due to contaminants in the Shipyard Sediment OU was initially demonstrated by bioassays and benthic abundance studies conducted during the EBAP investigation. Adverse benthic effects in the Shipyard Sediment OU were also demonstrated by bioassays conducted during the SRI. The RI mussel study results further indicate that copper, lead, zinc, and TBT in the shipyard sediments are biologically available and bioaccumulate in mussels, causing adverse biological effects in these organisms. Actual or threatened releases of hazardous substances from the Shipyard Sediment OU, if not addressed by implementing the remedy selected in this ROD, may present an imminent and substantial endangerment to human health and the environment.

Since the Shipyard Sediment OU is part of a ecologically rich and diverse estuarine habitat where juvenile salmonid feed, the cleanup objective for this OU is to reduce concentrations of hazardous substances to levels which will have no adverse effect on marine organisms. Chemical and biological cleanup standards which will meet this objective are contained in the Washington State Sediment Management Standards, which are the primary applicable or relevant and appropriate requirements (ARARs) for the Shipyard Sediment OU. The Sediment Management Standards define two levels of chemical and biological standards. The more stringent level, the "Sediment Quality Standard" (SQS), is the sediment cleanup objective and corresponds to a sediment quality which has no acute or chronic adverse effects on marine organisms. In other words, contaminant concentrations below the chemical SQS are not expected to cause adverse biological effects in marine organisms. The less stringent level, the "Cleanup Screening Level" (CSL), is the level above which minor adverse effects always occur in marine organisms. The biological standards are based on results of biological tests which demonstrate adverse effects in benthic organisms which dwell in sediments. If both biological and chemical data are obtained at a site, the biological data determine compliance with the Sediment Management Standards.

According to the Sediment Management Standards, sediment cleanup standards are established on a site-specific basis (WAC 173-204-570). The site-specific standard must be between the SQS, which is the cleanup objective, and the CSL, which is also known as the minimum cleanup level (MCUL). Criteria to be considered in the selection of a site-specific standard include technical feasibility, cost, and environmental benefit. The approach used to select the site-specific standard for the Shipyard Sediment OU was to determine the difference in costs and environmental benefits of technically feasible general response actions which achieve the SQS and the MCUL. There are three possible results of this type of evaluation. If neither costs nor benefits are significantly different between response actions which achieve the SQS and the MCUL, the SQS should be selected as the cleanup standard. If greater benefits are gained by achieving the SQS but costs are not significantly different, the SQS should also be selected as the cleanup standard. Finally, if costs are significantly greater to achieve the SQS but benefits are not significantly different, the MCUL should be selected as the cleanup standard.

The only feasible response action which would achieve the MCUL is to dredge to the CSL. The three feasible response actions which would achieve the SQS include: 1) dredging to the SQS, 2) capping contaminated sediments in place without dredging, and 3) dredging to the CSL and then capping (referred to as "dredging and capping"). The net environmental benefit of each method was qualitatively evaluated and ranked as either "low", "medium", or "high". Capping without dredging to achieve the SQS would likely result in a future release of contaminants which exceed the CSL if cap erosion occurs. Because cap erosion could result in the future release of contaminants exceeding the CSL, this method was ranked "low" for environmental benefit and was eliminated from further evaluation. Dredging to achieve the CSL was ranked "medium" for environmental benefit because remaining contaminants between the SQS and CSL are exposed to the environment and capable of causing minor adverse biological effects. Dredging to achieve the SQS was ranked "high" for environmental benefit because all contaminants of concern are removed from the environment. "Dredging and capping" was also ranked "high" because contaminants remaining after dredging to the CSL are isolated from the environment by a clean cap.

The estimated costs of the general response actions are based on the cost estimates of the remedial alternatives identified in this ROD (see, "Description of Remedial Alternatives"). The cost of dredging all sediments exceeding the CSL in the Shipyard Sediment OU, including long-term monitoring costs, would be approximately \$9.0 M. The cost of "dredging and capping" to achieve the SQS would cost approximately 15% more than dredging to the CSL. The cost of dredging to the SQS would cost approximately 70% more than dredging to the CSL.

The costs and environmental benefits of the CSL general response action were compared with the two SQS general response actions which provide a greater environmental benefit. Even though dredging to the SQS provides a greater benefit, it is significantly more expensive than dredging to the CSL, and therefore cannot justify selecting the SQS as the cleanup standard. On the other hand, "dredging and capping" to achieve the SQS can provide a greater environmental benefit with only a 15% increase in cost compared to the response of dredging to the CSL. Since the "dredging and capping" response can achieve a greater environmental benefit without a significant cost increase, this justifies selecting the SQS as the site-specific cleanup standard for the Shipyard Sediment OU. Therefore, the SQS is the cleanup standard for the Shipyard Sediment OU.

According to the RI and SRI chemical data, contaminants which exceed the chemical SQS in sediments at Todd Shipyards include copper, mercury, PCBs, LPAHs, and HPAHs. Contaminants which exceed the chemical SQS in sediments at Lockheed Shipyard include arsenic, copper, lead, mercury, and zinc. Biological effects data collected during the SRI from Todd and Lockheed Shipyards indicate that two stations failed the biological SQS at Todd and one station failed the biological SQS at Lockheed. However, in areas not tested during the SRI, the EBAP biological data indicate that two stations failed the biological CSL at Todd, and one station failed the biological CSL at Lockheed. Since there are both chemical and biological data for Todd and Lockheed Shipyard sediments which fail the SQS cleanup standard, remedial action is required for these sediments.

Contaminants which exceed the chemical SQS in the Shipyard Sediment OU, and their corresponding numerical SQS and CSL values, are shown in Table 4. The current standards for PCBs are not intended to be protective of human health from bioaccumulation of PCBs in seafood. Also, there are no standards for TBT, which is toxic to marine organisms. This ROD does not establish TBT or PCB bioaccumulation cleanup goals for the Shipyard Sediment OU. However, EPA intends to establish such cleanup goals in the ROD for the remaining contaminated sediments at Harbor Island.

## **I. DESCRIPTION OF REMEDIAL ALTERNATIVES**

Numerous technologies and techniques for removing, containing, or treating contaminated sediments were screened for their effectiveness, implementability, and cost in the Harbor Island Sediment Feasibility Study. As a result of this screening, three remedial alternatives which best met these criteria were identified for the Harbor Island sediments. These three alternatives are: 1) Capping, 2) Dredge to the Chemical SQS, and 3) Dredge to the Chemical

TABLE 4		
CHEMICAL SQS AND CSL FOR HARBOR ISLAND SEDIMENTS		
CONTAMINANT	SQS (mg/kg)	CSL (mg/kg)
Arsenic	57 d.w.	93 d.w.
Copper	390 d.w.	390 d.w.
Lead	450 d.w.	530 d.w.
Mercury	0.41 d.w.	0.59 d.w.
Zinc	410 d.w.	960 d.w.
PCBs	12 o.c.	65 o.c.
LPAHs**	370 o.c.	780 o.c.
HPAHs***	960 o.c.	5300 o.c.

d.w. =dry weight

o.c. =organic carbon normalized

\*\*low molecular weight polynuclear aromatic hydrocarbons

\*\*\*high molecular weight polynuclear aromatic hydrocarbons

CSL and Cap. To these three alternatives, a "No Action" alternative was added as a baseline alternative, against which the three active remedial alternatives could be compared.

At the time of this ROD, adequate information does not exist to select specific disposal sites for dredged contaminated sediments from Todd and Lockheed Shipyards. Two conventional disposal options for dredged contaminated sediments are confined nearshore disposal (CND) and confined aquatic disposal (CAD). Specific CND or CAD sites will be selected during remedial design after obtaining adequate information on available CND and CAD sites in the Elliott Bay area. However, since the capacity for CAD is limited in Elliott Bay, CND is considered the most feasible disposal option for the shipyard sediments, and is the option used to develop alternative cost estimates in this ROD. To determine a reasonable cost for disposal in a CND facility, EPA averaged CND costs associated with other dredging projects in Elliott Bay and Commencement Bay. This average CND cost was determined to be about \$30 per cubic yard of sediment. Independently, Todd Shipyards conceptually designed a CND facility which could be constructed at one end of the slips which Todd owns on the West Waterway. Todd's cost estimate for disposal in this on-site CND facility was about \$16 per cubic yard. Since Todd's on-site CND facility cost is significantly less than EPA's estimated average cost for CND, the cost estimates for Todd Shipyards' alternatives are shown as a range of cost. The lower end of each cost range is based on the estimated cost of disposal in the proposed on-site CND facility, and the higher end of the range is based on the average CND cost.

The cost estimates for Alternatives 2, 3, and 4 do not include the cost of dredging under-pier sediments because the cost, the environmental benefit, and effect on pier stability of dredging under-pier sediments has not been determined. In particular, the cost of under-pier dredging is strongly dependent on site-specific conditions and could be 5 to 10 times the cost of open-water dredging. Therefore, the extent of under-pier dredging necessary to meet the cleanup standard will be determined by EPA during remedial design. The cost estimates for Alternative 2 and 4 also do not include the cost of cap armoring because it is uncertain if armoring will be required until the remedial design is completed. The details of the cost estimates for each alternative are provided in Appendix B of this ROD.

#### **Alternative 1, No Action**

This alternative includes no containment, dredging, or institutional controls to reduce the exposure to the contaminated sediments. These sediments would remain in place and continue to act as a source of contaminants to the environment. There would be no further monitoring of biological effects or sediment contaminant concentrations under this alternative. There would be no cost associated with this alternative.

#### **Alternative 2, Capping**

This alternative consists of capping the shipyard sediments with up to 4 feet of clean sediment to contain the underlying contaminants and create a suitable benthic habitat. Prior to capping, a moderate amount of dredging would be required in the nearshore areas of the Todd and Lockheed Shipyards to maintain navigation depths and to reduce slopes to a grade of less than 20%, which would ensure cap stability. The cap may require armoring with

gravel or small rocks to protect it from erosion in areas exposed to ship traffic, dry dock activities, or natural forces. Long-term maintenance of the cap would be required to assure the effectiveness of this alternative. This alternative would decrease the water depth in the slips on the north side of Todd Shipyards and would restrict the size of vessels which could access these slips.

Dredging may be performed by either a cutterhead/pipeline dredge, watertight clamshell, or a suction dredge. Depending upon the restrictions to navigation allowable, and the distance to the disposal or holding area, the dredged sediments may be transported by either a pipeline or barge. The clean cap would be put in place either by a spilt-hull barge or by a hydraulic pipeline. In areas to be capped immediately adjacent and under piers, it would be necessary to use a pipeline to accurately place the capping material. Dredging and capping would not be conducted during the period of juvenile salmonid migration, which typically runs from April 1 to June 15.

Daily short-term water quality monitoring would be performed during dredging, capping, and disposal activities to assure that water quality standards are not exceeded. Long-term monitoring, by bathymetric surveys, would be required to verify cap stability and thickness. This monitoring would be performed one year after capping, and then periodically. To verify that the caps provide a suitable habitat for benthic organisms, biennial monitoring for benthic abundance would be conducted in the capped areas until it is demonstrated that a stable benthic community is established.

For this alternative, the estimated volume of sediment to be dredged at Todd Shipyards is 45,000 cubic yards and approximately 160,000 cubic yards of clean sediment would be needed for the cap. The estimated design and construction cost for this alternative at Todd Shipyards is \$3.0-3.9 Million (M). After construction is complete, ten years of cap monitoring and maintenance at Todd is estimated to cost \$1.0 M. The estimated volume to be dredged at Lockheed Shipyard is 21,000 cubic yards, and the volume of sediment required for the cap is about 23,000 cubic yards. The estimated design and construction cost for this alternative at the Lockheed Shipyard is \$1.7 M. Ten years of cap monitoring and maintenance at Lockheed would cost about \$0.5 M. It is estimated that it would take approximately 26-32 months to design and construct this remedy at Todd Shipyards, and 22-28 months to design and construct this remedy at the Lockheed Shipyard.

### **Alternative 3, Dredge to the Chemical SQS**

This alternative consists of dredging all shipyard sediments which exceed chemical SQS. No cap would be required in this alternative. Disposal sites for dredged sediments would be selected during the remedial design after the dredged sediments are characterized and available disposal sites are evaluated. Dredging and transport of dredged sediments would occur as described in Alternative 2. Short-term water quality monitoring of dredging and disposal activities would also occur as described in Alternative 2. This alternative would not require any long-term monitoring or maintenance.

Based on RI data, this alternative would require dredging approximately the uppermost 5-7 feet of sediment on the north side and approximately the uppermost 5 feet of sediment on the west side of Todd Shipyards. At the Lockheed Shipyard, approximately the uppermost 6 feet of sediment would have to be dredged. For this alternative, the estimated volume of sediment to be dredged at Todd Shipyards is 205,000 cubic yards, and the estimated design and

construction cost is \$6.4-10.7 M. The estimated volume to be dredged at Lockheed Shipyard is 32,000 cubic yards and the estimated design and construction cost is \$2.0 M. Monitoring for contaminant concentrations in the shipyard sediment areas would be required after dredging to assure that the cleanup goals are achieved. It is estimated that it would take approximately 30-36 months to design and construct this remedy at Todd Shipyards, and 22-28 months to design and construct this remedy at the Lockheed Shipyard.

#### **Alternative 4, Dredge to the Chemical CSL and Cap**

This alternative consists of dredging shipyard sediments which exceed chemical CSL and placing a minimum 2 foot cap of clean sediment to contain remaining contamination and create a suitable benthic habitat. This cap may require armoring with gravel or small rocks to protect it from erosion in areas exposed to ship traffic, dry dock activities, or natural forces. Long-term maintenance of the cap would be required to assure the effectiveness of this alternative. Disposal sites for dredged sediments will be selected during the remedial design after the dredged sediments are characterized and available disposal sites are evaluated. This alternative would maintain present water depth in the slips on the north side of Todd Shipyards and not restrict the size of vessels which could access these slips. Dredging, capping, and transport of dredged sediments would occur as described in Alternative 2. Short-term monitoring of water quality during dredging, capping, and disposal activities would be required as in Alternative 2. Long-term monitoring and maintenance of the cap would also occur as described in Alternative 2.

Based on RI data, this alternative would require dredging approximately the uppermost 2-4 feet of sediment at Todd Shipyards and approximately the uppermost 3-5 feet of sediment at the Lockheed Shipyard. For this alternative, the estimated volume of sediment to be dredged at Todd Shipyards is 116,000 cubic yards, and approximately 80,000 cubic yards of clean sediment would be needed for the cap. The estimated design and construction cost for this alternative at Todd Shipyards is \$4.5-6.9 M. Ten years of cap monitoring and maintenance at Todd is estimated to cost \$1.0 M. The estimated volume to be dredged at Lockheed Shipyard is 18,000 cubic yards, and the volume of sediment required for the cap is about 11,000 cubic yards. The estimated design and construction cost for this alternative at the Lockheed Shipyard is \$1.5 M. Ten years of cap monitoring and maintenance at Lockheed is estimated to cost \$0.5 M. It is estimated that it would take approximately 28-34 months to design and construct this remedy at Todd Shipyards, and 22-28 months to design and construct this remedy at the Lockheed Shipyard.

### **J. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

The above four alternatives for the Todd and Lockheed Shipyard sediments were evaluated using each of the nine criteria outlined in the National Contingency Plan. These criteria are:

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, and Volume through Treatment
- Short-Term Effectiveness
- Implementability

- Cost
- State Acceptance
- Community Acceptance

### *Overall Protection of Human Health and the Environment*

For overall protection of human health and the environment, Alternative 3 (Dredge to the Chemical SQS), ranks highest because it requires the removal of all contaminated sediments above the SQS cleanup goals and permanent disposal of the dredged sediments in an appropriate disposal facility. Alternative 4 (Dredge to the Chemical CSL and Cap), provides the next highest degree of protection because it requires removal and disposal of the most toxic sediments (which exceed the chemical CSL) and achieves the chemical SQS by isolating the remaining contamination under a minimum two-foot thick cap. Alternative 2 (Capping), provides the least degree of protection because it leaves the most toxic sediments in place and depends entirely on long-term containment of contamination for protection of human health and the environment. Alternative 1 (No Action) provides no protection of human health or the environment.

### *Compliance with ARARs*

Alternatives 2, 3, and 4 all achieve the site-specific cleanup standard, which is the chemical SQS of the Sediment Management Standards. If properly designed and implemented, these three alternatives would also comply with other ARARs which apply to dredging, capping, and disposal of contaminated sediments. Alternative 1 (No Action) does not comply with the minimum requirements of the Sediment Management Standards. Because Alternative 1 is not protective and does not comply with ARARs, it was eliminated from further consideration as a feasible alternative for the Todd and Lockheed Shipyards.

### *Long-Term Effectiveness and Permanence*

Alternative 3 offers the highest degree of long-term effectiveness and permanence because it requires removal of all sediments exceeding the chemical SQS, which is the level at which adverse biological effects may begin to occur in marine organisms. Alternative 4 ranks next because it requires removal and disposal of the most toxic sediments (exceeding the chemical CSL) which are most likely to cause adverse biological effects in marine organisms. Alternative 2 offers the least amount of permanence because all contaminated sediment remains in place where it may be released to the environment if the cap is damaged or eroded by natural forces or shipping activity. The long-term effectiveness of Alternatives 2 relies heavily on long-term maintenance of the cap to ensure cap integrity and containment of underlying contaminated sediment.

### *Reduction of Toxicity, Mobility, and Volume through Treatment*

As originally described in the Feasibility Study, none of the remedial alternatives included treatment to reduce toxicity, mobility, or volume because it was believed that there were no available full-scale technologies capable of addressing the complex mixture of contaminants found in the shipyard sediments. However, after further consideration, it was decided that a physical separation technology may cost-effectively separate sandblast grit from sediment,

reducing the volume of dredged material requiring expensive upland disposal. The cost-effectiveness of physical separation technologies will be further evaluated during remedial design. Therefore, all three viable remedial alternatives are equally ranked for this criterion.

### *Short-Term Effectiveness*

Alternative 2 offers the highest degree of short-term effectiveness because it involves the minimum amount of disturbance of contaminated sediments, which will minimize the release of these contaminants to the environment and the exposure of workers to contaminants. Alternative 4 provides the next best short-term effectiveness because it requires dredging of only moderate volumes of sediment with slightly increased possibility of release of contaminants to the environment and worker exposure. Alternative 3 provides the least amount of short-term effectiveness because it requires dredging of the largest volumes of sediment and the greatest potential for release of contaminants to the environment and worker exposure.

Short-term adverse environmental impacts would result from the implementation of Alternatives 2, 3, or 4 due to the displacement of bottom dwelling organisms during dredging and capping. It is expected that this disturbance would be temporary and that marine organisms would recolonize the new bottom surface in a relatively short time.

### *Implementability*

All three alternatives can be implemented using conventional dredging and capping technology. However, the primary difficulty in implementing any of the alternatives would be the extent of adverse impact on the operation of Todd Shipyards, which is an active shipyard facility. The extent of adverse impact to Todd Shipyards can best be measured by the duration of in-water dredging and capping activities, and by the degree of restrictions placed on the future use of the facility by each alternative. In terms of in-water activities, it would take approximately 19 weeks of in-water activities to implement alternative 2, approximately 5 weeks to implement alternative 3, and approximately 12 weeks to implement alternative 4. In terms of future use of the Todd Shipyards facility, Alternatives 3 would have the least amount of adverse impact because it would allow for unrestricted maintenance dredging to deepen the slips on the north side of Todd Shipyards for use by deeper draft vessels. Alternative 4 would not require a reduction in the size of vessels which could access the slips, but future maintenance dredging would be allowed only if it maintained the protectiveness of the remedy. Alternative 2 would decrease the water depth in the slips by up to four feet by the placement of a cap, and would likely restrict future use of the slips to vessels smaller than the current maximum size. Based on these considerations of potential adverse impacts during and after remediation, alternative 3 ranks highest for implementability, alternative 4 ranks second, and alternative 2 ranks lowest.

### *Cost*

The alternative cost estimates for Lockheed and Todd Shipyards, not including long-term monitoring and maintenance costs, are shown in Table 5. The cost of disposing dredged sediments is a major portion of the total cost for alternatives 3 and 4. For the purpose of estimating alternative costs in this ROD, it is assumed that all dredged sediments are placed in a CND facility. The cost estimates for Todd Shipyards are a range of costs. The lower

end of each range is based on disposal in a CND facility at Todd Shipyards, and the higher end of the range is based on an average of estimated CND costs for dredging projects in Elliott Bay and Commencement Bay. The cost estimates do not include the costs for cap armoring, habitat mitigation, or under-pier dredging. The need for these additional actions will be determined during remedial design.

For the Lockheed Shipyard, the volumes of dredged sediment for Alternatives 2 and 4 are about the same, resulting in a small cost difference between these two alternatives. However, the volume of dredged sediment associated with Alternative 3 is about 75% greater than Alternative 4, which causes the total cost for Alternative 3 to be about 30% greater than the cost for Alternative 4.

For Todd Shipyards, the volumes of dredged sediment are significantly different for each alternative, resulting in a large cost differential between each of the alternatives. Alternative 2 is the least expensive, alternative 4 is about 50-75% more than alternative 2 depending on whether on-site or off-site CND is used, and alternative 3 is about two to three times as expensive as alternative 2 depending on which disposal option is used.

**Table 5**

**Alternative Cost Estimates (\$ M)**

<u>Alternative</u>	<u>Lockheed Shipyard</u>	<u>Todd Shipyards</u>
2	1.7	3.0-3.9
3	2.0	6.4-10.7
4	1.5	4.5-6.9

*State Acceptance*

The remedial alternatives described in this ROD have been developed in coordination with Ecology. Ecology believes that the selected alternative is consistent with the Sediment Management Standards and will provide benefits to the environment and to the public.

*Community Acceptance*

Several sets of comments were received in response to the Proposed Plan for the Shipyard Sediments Operable Unit. A summary of these comments and EPA's responses to these comments appear in the Responsiveness Summary, Attachment A. None of these comments recommended selecting an alternative other than the preferred alternative. EPA therefore retained the preferred alternative as the selected remedy.

## K. THE SELECTED REMEDY

### 1. Description of the Selected Remedy

Based on CERCLA, the NCP, the Administrative Record, the comparative analysis of the alternatives, and public comment, EPA has selected Alternative 4, Dredge to the Chemical CSL and Cap, as the remedy for the Harbor Island Shipyard Sediment OU. Alternative 3, Dredge to the Chemical SQS, is identified as a contingent remedy if sediment sampling conducted during remedial design indicates that Alternative 3 provides a better cost-benefit than Alternative 4.

Alternative 4 was chosen over Alternative 2 primarily because there would be less adverse effect on the environment if the cap were eroded in the future and underlying contaminants were released to the environment. In addition, Alternative 4 can be implemented with less adverse impact on the operation of Todd Shipyards during remediation, and Alternative 4 would maintain present water depth in the slips on the north side of Todd Shipyards and not restrict the size of vessels which could access these slips.

Alternative 4 was chosen over Alternative 3 because, based on RI data, Alternative 3 would be about 50% more expensive to implement for the Shipyard Sediment OU than Alternative 4. Therefore, Alternative 4 would be more cost-effective in protecting human health and the environment than Alternative 3. However, comprehensive sediment core sampling to be conducted during remedial design will allow a more accurate estimation of sediment volumes exceeding both the chemical SQS and CSL. If this sampling indicates, contrary to RI data, that the volume of sediment exceeding the SQS is not significantly greater than the volume exceeding the CSL, a cost-benefit analysis will be conducted. This cost-benefit analysis will determine: 1) the costs of dredging and disposing the volumes of sediment exceeding the CSL and the SQS, 2) the costs of constructing and maintaining the cap required for Alternative 4, which would be the cost saved if a cap is not necessary, and 3) the incremental environmental benefit of dredging to the SQS instead of dredging to the CSL and capping. Based on the results of this analysis, if Alternative 3 is shown to provide a greater environmental benefit at an equal or marginally increased cost, Alternative 3 will be implemented instead of Alternative 4. If the remedy is changed to Alternative 3, EPA will document this change in the form of an Explanation of Significant Difference.

The essential elements of the selected remedy for the Shipyard Sediment OU are:

- 1) All sediments exceeding the chemical CSL and shipyard waste must be dredged. This also applies to sediments and shipyard waste in the shipways at Lockheed Shipyard. The extent of dredging of contaminated sediments and waste under piers at Todd and Lockheed Shipyards will be determined during remedial design based on cost, benefit, and technical feasibility;
- 2) Dredged sediments must be disposed in appropriate confined nearshore disposal (CND) or confined aquatic disposal (CAD) facilities. Appropriate CND or CAD sites will be selected during remedial design. If suitable CND or CAD sites are not identified, dredged sediments must be taken to an appropriate upland disposal facility. Any dredged material which is predominately shipyard waste must be disposed in a solid waste disposal facility. Sandblast grit may be recycled as feedstock for cement production;

3) After dredging, all remaining areas which exceed the chemical and/or biological SQS must be capped with a minimum two feet of clean sediment. The cap will meet the SQS cleanup objective by isolating remaining contaminants and preventing release of these contaminants to the environment. The cap is also intended to be protective of any future cleanup goals for TBT and PCB bioaccumulation by eliminating the exposure pathways associated with residual concentrations of these contaminants. The cap may require armoring with gravel or small rocks if analyses conducted during remedial design demonstrate that armoring is necessary;

4) Dredging and capping must be conducted with the objective of creating a flat surface out to the boundary of the Shipyard Sediment OU to minimize the potential for recontamination of the cap by resuspended contaminated sediments from other sources. Dredging, capping and disposal methods must also minimize adverse impacts to the existing habitat. In particular, the selected dredging and disposal methods shall minimize the release and resuspension of contaminated sediments to the environment. To the extent practicable, the marine habitat in the Shipyard Sediment OU must also be restored to its most productive condition; and

5) Long-term monitoring of contaminant concentrations in the cap, and monitoring of cap thickness, must be periodically conducted. Long-term maintenance of the cap, which involves adding supplemental clean sediment to the cap, must periodically be performed to maintain the cap at a minimum 2-foot thickness. Future maintenance dredging in the Shipyard Sediment OU would be allowed only if it maintains the protectiveness of the selected remedy.

Significant recontamination of the cap required by this remedy is not anticipated because contaminated sediments deposited on this cap will be mixed with clean sediments in the top 10 centimeters of the cap through bioturbation (burrowing of marine organisms). In addition, the periodic addition of clean sediment to the cap, as required by long-term maintenance, is expected to maintain contaminant concentrations below the chemical SQS.

Dredged material which is predominately shipyard waste will be managed as a solid waste. Based on the composition of sediment cores collected during the RI, the volume of such shipyard waste is expected to be a small fraction of the total dredged sediment volume. The two disposal options for shipyard waste are: 1) it can be disposed in a solid waste disposal facility, or 2) pure sandblast grit, and grit which can be separated from sediment, can be recycled as feedstock for cement production. In order to separate sandblast grit from dredged sediment for recycling, a physical separation technology, such as hydrocycloning, will be used in the remedy if during remedial design this technology is found to be technically feasible, practical to implement, and cost-effective.

Subsurface sediment data collected during the RI indicate that the depth to the chemical CSL near the shoreline at Todd Shipyards is about 4 feet below the sediment surface, and about 2 feet below the surface further out from the shoreline. This subsurface sediment data also indicate that the depth to the chemical CSL at Lockheed Shipyard ranges from about 3 to 5 feet below the surface. Based on these data, the selected remedy requires dredging approximately 116,000 cubic yards of sediment at Todd Shipyards and placing approximately 80,000 cubic yards of clean sediment for a cap at that location. The estimated volume to be

dredged at Lockheed Shipyard is about 18,000 cubic yards, and volume of clean sediment required for this cap is about 11,000 cubic yards.

The estimated cost of the selected remedy is based on the assumption that the entire area defined as the Shipyard Sediment OU will be dredged and capped out to the steep slopes of either Elliott Bay or the West Waterway. The cost estimate for the selected remedy also assumes that all dredged sediments can be placed in a CND facility. The estimated cost to design and construct this remedy for Todd Shipyards is \$4.5-6.9 M. After construction is complete, ten years of cap monitoring and maintenance at Todd Shipyards is estimated to cost \$1.0 M. The estimated cost to design and construct this remedy for the Lockheed Shipyard is \$1.5 M. The cost of ten years of cap monitoring and maintenance at Lockheed Shipyard is estimated to be \$0.5 M. These cost estimates do not include the costs of habitat mitigation, under-pier dredging, or cap armoring. The need for these additional actions will be determined during remedial design.

It is estimated that it would take approximately 28-34 months to design and construct the selected remedy at Todd Shipyards, and 22-28 months to design and construct this remedy at Lockheed Shipyard. Dredging activities will take approximately 3 weeks at Todd Shipyards, and 1 week at Lockheed Shipyard. Capping activities will take approximately 9 weeks at Todd Shipyards, and 2 weeks at Lockheed Shipyard. EPA will consider the impact on operations at Todd Shipyards when establishing the schedule for remedial action at Todd Shipyards.

#### **Source Control Prior to Remedial Action**

The first step of the remedy is to ensure that source identification and source control have been adequately implemented at Todd and Lockheed Shipyards. Source control is implemented to eliminate or reduce, to the extent practicable, the release of contaminants to the marine sediments, such that sediments are not recontaminated after remediation. Source control includes the application of regulatory mechanisms and remedial technologies to be implemented according to applicable or relevant and appropriate requirements (ARARs), including the application of all known, available, and reasonable methods of treatment (AKART) for NPDES-permitted discharges, as necessary to achieve and maintain sediment cleanup objectives, and to ensure compliance with environmental regulations.

Source identification efforts will focus on identifying any potential sources of contaminants from the shipyards to the Shipyard Sediment OU. Source identification includes an assessment of all potential pathways (e.g., soil, groundwater, stormwater, storm drain sediments), as well as any permitted or non-permitted direct discharges related to on-site practices (e.g., active shipyard work in upland areas, along piers, and in marine ways/dry docks). Source control efforts will focus on implementing methods to adequately control any ongoing sources to ensure that sediments will not be recontaminated after remediation. Source control documentation, including certification that adequate source control efforts have been achieved such that sediment recontamination is not expected, will be summarized in a Source Control Report to be submitted by both Todd and Lockheed Shipyards for EPA approval prior to sediment remediation.

## Monitoring During Remedial Action

Monitoring during dredging, disposal, and capping must be conducted to assure that the cleanup is constructed as designed, and that there are no unavoidable environmental impacts. During dredging, bathymetric surveys or other appropriate techniques shall be employed to verify that dredging occurs to the depths necessary to remove all contaminated sediments exceeding the chemical CSL. This should include a baseline survey of the targeted dredging areas, and a post-dredge survey. Monitoring during placement of the cap will verify that the cap is placed as designed, and that the proper thickness is achieved. *In-situ* markers, bathymetric surveys, or other appropriate techniques shall be conducted during capping to monitor placement location and thickness. Cap thickness will also be verified by sediment core samples collected immediately after construction.

Water quality monitoring must also be performed during dredging to measure contaminant release to the water and assure that the marine acute water quality criteria are not exceeded. This monitoring will consist of grab samples at various depths throughout the water column and at various distances from the dredge activity. Analyses will include real-time conventional analyses of dissolved oxygen and turbidity, and chemical analyses for contaminants of concern in the shipyard sediments.

In-water disposal monitoring must be conducted to verify that sediment disposal is occurring as designed, and evaluate sediment loss at the disposal site. Positioning equipment on board disposal barges will be used to verify navigation position prior to disposal. Bathymetric surveys will then be used to verify where placement occurred on the bottom.

## Long-term Monitoring and Cap Maintenance

Long-term monitoring and maintenance of the cap is expected to be performed for a minimum of 30 years. Techniques such as bathymetric surveys, *in-situ* markers, side-scan sonar, or sediment vertical profile camera will be used to verify cap thickness and stability after the remedy is constructed. This monitoring must be performed one year after capping, and then periodically, as determined by the stability of the cap. In addition, prop-wash related erosion should be evaluated by spot monitoring of limited areas that are exposed to potential erosion by prop-wash. Spot monitoring should be conducted in areas where berthing operations occur and in areas where ships and/or tugs navigate close to or over the cap. To assure that the cap is not recontaminated by other sources, surface grab samples (0-10 cm) will be collected from the cap and analyzed for contaminants of concern. The frequency of this type of sampling will be determined during remedial design. To verify that the caps provide a suitable habitat for benthic organisms, biennial monitoring for benthic abundance must be conducted in the capped areas until it is demonstrated that recolonization is occurring at a reasonable rate, and that a diverse benthic community is established comparable to a suitable reference location.

It is anticipated that an additional 1-foot thickness of clean sediment will need to be added to the cap every five years to maintain the cap thickness at the minimum 2-foot thickness. However, long-term monitoring will identify the rate of cap erosion and will determine the frequency at which supplemental clean sediment must be added to the cap to maintain its minimum thickness. If the cap is not initially armored, erosion rates determined by long-term monitoring will be used to reevaluate the need to armor the cap.

## **2. Remedial Design Objectives**

### **a. Identify Sediment Contamination Exceeding the CSL and SQS**

The area and depth of sediment exceeding the chemical CSL and SQS throughout the Shipyard Sediment OU, including the areas under the piers, will be determined by collecting sediment cores during remedial design. These data will be used to determine the depth of dredging required in each area, and will also be used to accurately determine the volume of sediment to be dredged. Each sediment core will be divided into several samples including a surface sample (0-10 cm), and samples at 2-foot increments to a depth of 10 feet, or until native sediment is reached. Sediment samples will be analyzed for arsenic, copper, lead, mercury, zinc, PCBs, and PAHs. Analytical techniques will be sufficiently sensitive to detect chemical concentrations at or below SQS concentrations. Sediment core samples will also be visually inspected to identify areas containing significant concentrations of sandblast grit.

### **b. Conduct Confirmatory Biological Effects Tests**

Although not required, confirmatory biological effects tests may be conducted by the Potentially Responsible Parties (PRPs) during remedial design in order to determine the acute and chronic toxicity of sediments to marine organisms, and to evaluate potential adverse effects associated with bioaccumulation of PCBs, TBT, and mercury. The suite of biological tests which will be allowed include two acute tests and one chronic test as specified in the Sediment Management Standards (WAC 173-204-315), and alternative biological tests designed to assess bioaccumulation and associated adverse effects. If the PRPs decide to conduct biological effects tests, EPA will determine which specific biological tests are appropriate for the Shipyard Sediment OU after consultation with Ecology. It is anticipated that the allowed suite of biological tests will be similar to that recently completed by the Port of Seattle for the Terminal 18 maintenance dredging project in the East Waterway. If confirmatory biological tests are not conducted, exceedance of the chemical SQS will determine which areas require remediation.

### **c. Characterize Dredged Sediments**

Sediment to be dredged will be characterized to predict sediment behavior during dredging and disposal, and to support the design of a CND or CAD facility. The characterization may include: leach tests to determine the ability of contaminants to migrate from a the disposal site, determination of grain size distribution, Atterberg limits, bulk density, shear strength, total organic carbon, and *in situ* and post-dredging density/water content. Potential contaminant migration pathways will also be evaluated, including release of leachate to surface water during dredging and disposal, and migration of contaminants through containment materials at the aquatic disposal site.

If it is necessary to dredge sediment which does not exceed the chemical CSL in order to construct a flat cap, such sediment may be eligible for PSDDA open-water disposal. To determine if this sediment is suitable for PSDDA disposal, additional tests must be conducted according to PSDDA guidance, including: core sample densities, compositing strategies, biological tests to determine sediment toxicity, and biological tests to determine potential bioaccumulation of contaminants in marine organisms.

#### **d. Evaluate Armoring of the Cap**

The potential for the cap to be eroded as a result of prop wash, dry dock activity, or natural forces will be evaluated during remedial design. Current velocities will be measured throughout the areas to be capped and modeling will be conducted to determine if a sandy sediment cap will experience unacceptable erosion. If it is determined that a sandy cap is not adequate, methods of armoring the cap, such as using gravel or small rocks, will be evaluated and the most appropriate method will be used to protect the cap from erosion.

#### **e. Conduct Habitat Inventory**

It is important that cleanup activities do not cause additional adverse impacts to the habitat in the Shipyard Sediment OU, and to the extent possible, contribute to restoration of productive habitat in this area. In order to accomplish this objective, a habitat inventory of the Shipyard Sediment OU will be conducted during the remedial design. This inventory will include evaluation of the physical characteristics of the habitat (e.g., bathymetry, grain size) as well as biological characteristics of the habitat (e.g., benthic community structure and prey base use, aquatic vegetation, and salmonid and forage fish use). Land use, structures, and other attributes of the habitat that may affect its productivity will also be noted. This habitat inventory will serve as a baseline for evaluating the success of remedial and mitigation activities carried out for the shipyard sediments.

In order to minimize and mitigate adverse impacts of remediation identified in this ROD, EPA intends to ask the natural resource trustees for Harbor Island to assist in reviewing the remedial design. The trustees may also independently develop a habitat restoration plan for the Duwamish estuary. If such a habitat restoration plan is developed after this ROD is issued, the relevant criteria in the restoration plan shall be incorporated into the shipyard sediment remedial design to the maximum extent practical.

#### **f. Evaluate Potential Disposal Sites**

At the time of this ROD, adequate information does not exist on potential CND or CAD sites in the Elliott Bay area to support the selection of specific disposal sites. The appropriate disposal sites will be selected during the remedial design after all feasible CND and CAD sites in Elliott Bay are evaluated. If the selected disposal sites are within the Harbor Island Superfund Site, EPA will elicit public comment on the disposal sites through an Explanation of Significant Differences, which is a modification to the ROD. If the selected disposal sites are outside of the Harbor Island Superfund Site, the public will be allowed to comment on the disposal sites through the dredged disposal permit process required under Section 404 of the Clean Water Act, which is administered by the Army Corps of Engineers.

Criteria which will be used to evaluate potential disposal sites include: location; rate and extent of groundwater discharge in project area; proximity to Harbor Island; effectiveness in containing contaminated sediment; impacts to the marine habitat; the potential for habitat mitigation; implementability; long- and short-term harbor area and aquatic land use impacts, with consideration to commerce, navigation, and existing business; and cost. Determination of physical characteristics such as sedimentation rates, current velocities, and bottom depth, grain size, and a habitat assessment of the potential disposal sites may also be needed to assist EPA in the selection of the best disposal sites.

#### **g. Evaluate Physical Separation Technologies**

Physical separation methods, such as hydrocycloning, have the potential to separate sandblast grit, the primary component of shipyard waste, from dredged sediment. If sandblast grit can be successfully separated from dredged sediment, this sandblast grit could be recycled as cement feedstock and the amount of dredged material requiring expensive upland disposal could be reduced. There is also the potential that physical separation could reduce the volume of dredged sediment requiring placement in a CND or CAD facility. To determine if a physical separation technology should be used in the remedy, the technical feasibility, implementability, and cost-effectiveness of all applicable physical separation technologies will be evaluated in the remedial design. If a separation technology is found which meets these criteria, it will be implemented as part of the remedy.

#### **h. Determine the Extent of Dredging Under-Pier Sediments**

Adequate under-pier sediment data does not exist to determine the extent of under-pier dredging required to achieve the chemical CSL at Todd and Lockheed Shipyards. Also, the cost of under-pier dredging may be several times more expensive than open water dredging. Therefore, the cost of dredging to the chemical CSL under piers at Todd and Lockheed Shipyards will be determined during the remedial design. This cost will be compared to the environmental benefit gained by dredging to the CSL. If the benefit gained is disproportionate to the cost of dredging under piers, EPA may select an alternate method for achieving the cleanup standard in the under-pier sediments. In addition, dredging under piers may not be feasible if it were to cause the piers to become unstable. To determine the potential effect of dredging on pier stability, a structural analysis of the piers will be conducted during remedial design. The results of this structural analysis will be factored into EPA's decision on the extent of dredging required under the piers.

### **L. STATUTORY DETERMINATIONS**

The selected remedy for the Shipyard Sediment OU will comply with CERCLA Section 121 as follows:

#### **1. Overall Protection of Human Health and the Environment**

Long term protection of marine organisms, which are exposed to contaminated shipyard sediments, is obtained by dredging and disposing all contaminated sediment which exceeds the chemical CSL and capping the remaining contaminated sediment with a minimum 2 foot cap of clean sediment. These actions remove the most contaminated sediment from the shipyard sediments and reduce the mobility of the remaining contamination by containing it underneath a cap. The selected remedy may also incrementally reduce the overall risk to human health from consumption of Harbor Island seafood by eliminating sources of PCBs in the shipyard sediments. PCBs are of concern, from a human health perspective, because of their ability to bioaccumulate in seafood.

Existing aquatic habitat and biota would be destroyed in areas where dredging occurs. However, after placement of the cap, the cap will be recolonized by opportunistic species that are available as larvae in adjacent habitats. The rate of colonization will be dependent

upon the time of year when the cap is placed. Larval recruits may be present year round, but are more abundant in the spring and summer. As organic material becomes incorporated into the cap, the benthic community will likely diversify with a concomitant increase in overall abundance. Additional shifts in community composition may occur, as opportunistic species are displaced by other, more competitive community members. The abundance and diversity of benthic organisms on the cap will likely reach a maximum in 3 to 5 years, based on similar capping projects in Commencement Bay.

To protect migrating species of juvenile salmon, the dredging activities will be performed outside of the fisheries closure period of April 1 through June 15. Tribal fishing areas and fisheries are located near the areas to be dredged. Therefore, dredging will be performed at times which minimize the impact on Tribal fishing activities.

Protection to the environment will also be achieved during dredging and disposal by using methods which minimize the release of contaminants to the surface water. Surface water samples will be collected during dredging and disposal of sediments to ensure that water quality standards are not exceeded. Any release of contaminated sediments would be of short duration and would be minimized by the use of appropriate dredging equipment and engineering controls. Any activities which cause the water quality standards to be exceeded would be stopped until appropriate corrective actions were implemented.

The potential for workers to be exposed to contaminated sediment would be short-term and would pose a low risk. Activities that would result in worker exposure include handling of dredged sediment, transport of sediment, and disposal of sediment. Protection of workers during remediation will be achieved through compliance with OSHA and WISHA requirements, the use of personnel protective equipment, and other safety measures and engineering controls.

## **2. Compliance With ARARs**

The selected remedy will comply with all chemical, action, and location specific ARARs.

### **Federal Water Quality Standards, (33 U.S.C. 1251 et seq.; 40 C.F.R. 131)**

Ambient water quality criteria have been published as a requirement of the Clean Water Act in order to protect aquatic organisms and human health. CERCLA requires the attainment of water quality criteria where relevant and appropriate. Criteria for the protection of marine aquatic life are relevant and appropriate requirements for discharges to surface water during sediment remediation.

### **Washington State Sediment Management Standards (Chapters 43.21C, 70.105D, 90.48, 90.52, 90.54, and 90.70 RCW; Chapter 173-204 WAC)**

Numerical and narrative criteria for chemicals and biological effects are specified for sediment, and are applicable to Harbor Island shipyard sediments. For the Shipyard Sediment OU, the chemical Cleanup Screening Levels (CSLs) are the levels which trigger a remedial action. Once a remedial action is required, the chemical Sediment Quality Standards (SQS) are the long-term cleanup objectives and the CSLs are the minimum cleanup objectives.

**Washington State Water Quality Standards for Surface Waters (Chapter 173-201-045,-047 WAC)**

Narrative and quantitative limitations for surface water protection are provided in these regulations. Criteria are established for each water classification, including such items as fecal coliform, total dissolved gas, total dissolved oxygen, temperature, pH, and turbidity. The criteria do not apply within dilution zones near point sources. However, within dilution zones, fish and shellfish should not be killed, nor should aesthetic quality be diminished. The requirements for marine water are applicable for discharges to surface water during sediment remediation.

**Washington State Water Pollution Control Act (90.48 RCW), Water Resources Act (90.54 RCW)**

Requirements for the use of all known, available and reasonable technologies (AKART) for treating wastewater prior to discharge to state waters are applicable to remedial actions involving discharges to surface water during dredging, disposal, or dewatering activities.

**Hydraulics Code Rules on Dredging (Chapter 220-110-130,-320 WAC)**

Permits must be obtained from the Department of Fish and Wildlife for any project that may interfere with the natural flow of surface water. On-site actions must achieve substantive permit requirements.

**National Pollutant Discharge Elimination System (40 C.F.R. 122, 125); State Discharge Permit Program; NPDES Program (Chapter 173-216,-220 WAC)**

Conditions to authorizing direct discharges to surface water are specified under 40 CFR 122. Criteria and standards for discharges are specified in 40 CFR 125. The state of Washington has been authorized by the EPA to implement the NPDES permit program (Chapter 173-216,-220 WAC). These requirements are applicable to direct discharges to surface water conducted as part of the remedial action. Substantive permit requirements would be met for on-site activities.

**Solid Waste Disposal Act (42 U.S.C. 3251 et seq.; 40 C.F.R. 257, 258); Washington State Minimum Functional Standards for Solid Waste Handling (Chapter 173-304 WAC)**

Requirements for the management of solid wastes may be applicable to dredged sediment which is predominately shipyard waste and to sandblast grit which is separated from dredged sediment. Such separated sandblast grit may be suitable for recycling as feedstock for cement production.

**Washington State Dangerous Waste Regulations (Chapter 173-303 WAC)**

This regulation is applicable to any dredged shipyard waste which is determined to be a dangerous waste. Such shipyard waste must be treated, stored, and disposed in accordance with the sections of these regulations. Section 173-303-070 describes the procedures for testing shipyard waste to determine if it is a dangerous waste.

**Clean Water Act, Dredge and Fill Requirements Under Sections 401 and 404 (33 U.S.C. 1251 et seq.; 40 C.F.R. 230, 231; 33 C.F.R. 320-330)**

These applicable regulations specify requirements for the discharge of dredged or fill material to waters of the U.S., including wetlands. Dredge and fill activities, such as will occur during remediation of the Shipyard Sediment OU, are specifically regulated by requirements outlined in Section 404. These regulations also provide guidelines for the

specification of disposal sites, and define permit requirements for dredge and fill operations which would apply to the remedial action.

**Seattle Shoreline Master Plan; State Shoreline Management Act (RCW 90.58)**

Filling, dredging, and other remedial activities conducted within 200 feet of the shoreline will comply with the promulgated substantive requirements of this plan, which was developed pursuant to the State Shoreline Management Act.

**Rivers and Harbors Appropriations Act (33 U.S.C. 403, 33 C.F.R. 322)**

Section 10 of this statute requires a permit from the U.S. Army Corps of Engineers for construction of marinas, piers, and outfall pipes, and for dredging and filling below the mean high-water line in navigable waters of the United States. Dredging and filling which occur within the Harbor Island site as part of the selected remedy must meet the substantive requirements of the permit.

**Executive Order 11990, Protection of Wetlands (40 C.F.R. 6 Appendix A)**

Applicable to open waters and estuarine intertidal emergent and unconsolidated shore located in and near the site. Remedial activities must be performed so as to minimize the destruction, loss, or degradation of wetlands. Mitigation would be performed to ensure that no net loss of wetlands occurred.

**Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.; 50 C.F.R. 200, 402)**

Applicable to surface water around Harbor Island which is used as a salmonid migratory route. Remedial actions must be performed so as to conserve endangered or threatened species, including consultation with the Department of the Interior.

**U.S. Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.)**

This Act is an applicable requirement because the site surface water is used as a salmonid migratory route and includes potential use by bald eagles, etc. This act prohibits water pollution with any substances deleterious to fish, plant life, or bird life and requires consultation with the U.S. Fish and Wildlife Service and appropriate state agencies.

**Items to Be Considered (TBCs)**

Additional policies, guidance, and other laws and regulations which will be considered for the Shipyard Sediment OU remedy include:

**Dredge Disposal Analysis (PSDDA)**, which includes requirements and guidelines for evaluating dredged material, disposal site management, disposal site monitoring, and data management.

**EPA Wetland Action Plan**, which describes the National Wetland Policy and primary goal of "no net loss".

**Water Quality Management Plan**, which sets water quality objectives relating to confined disposal of contaminated sediments.

**Stormwater Management Program**, (pursuant to 40 CFR Parts 122-24, and RCW 90.48), which describes stormwater management objectives which may apply to stormdrains at Todd and Lockheed Shipyards on Harbor Island.

**Puget Sound Estuary Program Protocols (1987)**, as amended, which provides sample collection, laboratory analysis, and QA/QC procedures for sampling and analyzing sediment samples.

**Standards for Confined Disposal of Contaminated Sediments (1990)**, which includes standards and guidance developed by Ecology for confined disposal of dredged contaminated sediments.

### **3. Cost-Effectiveness**

The selected remedy provides protection of human health and the environment proportionate to its costs. Alternative 4, the selected remedy, is more cost effective than Alternative 3 in protecting human health and the environment. The selected remedy also provides better protection to human health and the environment, in proportion to its cost, than Alternative 2.

### **4. Preference for Treatment as a Principal Element**

Treatment of contaminated sediment to reduce toxicity or mobility of contaminants was not considered feasible for the shipyard sediments. Such technologies were eliminated either because they would not be effective on the mixture of organics and inorganics present in the sediment, had not been demonstrated at full-scale operation, or were difficult to implement because they would require additional handling, storage, and processing of a large volume of contaminated sediment. However, physical separation technology, such as hydrocycloning, is capable of reducing dredged sediment volume requiring upland disposal. If a physical separation technology is demonstrated to be technically feasible and cost-effective to use on the shipyard sediments during remedial design, it will be incorporated into the selected remedy.

### **5. Utilization of Permanent Solutions and Resource Recovery Technologies to the Maximum Extent Practical**

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost effective manner for remediation of the Harbor Island shipyard sediments. The selected remedy provides the best balance in terms of protection of human health and environment, long-term effectiveness and permanence, short-term effectiveness, implementability, and cost.

Dredging of the most contaminated sediments and disposal of these sediments in a CND or CAD facility will permanently confine the contaminants responsible for the highest human health and environmental risks at this site. Physical separation technology, such as hydrocycloning, has the potential to reduce the volume of dredged sediment requiring upland

disposal. Such technology will be evaluated during the remedial design for potential incorporation into the selected remedy.

#### **M. DOCUMENTATION OF SIGNIFICANT CHANGES**

The area of the Shipyard Sediment OU in this ROD is about 25% larger than the area identified in the Proposed Plan because the outer boundaries of the OU have been expanded to the steep slopes of Elliott Bay and the West Waterway. At Todd Shipyards the outer boundary is located approximately at the -42 foot MLLW contour of Elliott Bay (to the north), and at the -42 foot contour of the West Waterway (to the west). At Lockheed Shipyard the outer boundary is located approximately at the -36 foot MLLW contour of the West Waterway. This change is a logical outgrowth of the Proposed Plan and was made because the sediments within these boundaries are distinct from other contaminated sediments at Harbor Island because they are predominately contaminated with hazardous substances and shipyard wastes released by shipbuilding and maintenance operations at Todd and Lockheed Shipyards.

The cost estimates for remedial alternatives in this ROD are revised from the cost estimates which appeared in the Proposed Plan because: 1) the 25% increase in area of the Shipyard Sediment OU increases costs of dredging, capping, and sediment disposal required for each alternative in proportion to the increase in area and associated dredged sediment volumes, 2) the alternative contingency allowance is reduced from 25% to 10% for each alternative, reducing alternative cost estimates by about 15%, and 3) alternative cost estimates are based on disposal of dredged sediments in a CND facility, which is now considered to be the most feasible and cost effective disposal method for disposing the sediments dredged from Todd and Lockheed Shipyards.

**APPENDIX A**  
**RESPONSIVENESS SUMMARY**

# **RESPONSIVENESS SUMMARY HARBOR ISLAND SHIPYARD SEDIMENT RECORD OF DECISION**

## **Overview**

From 1903 to 1905, Harbor Island was created from marine sediments dredged from the Duwamish River. Harbor Island has been used for commercial and industrial activities including shipping, railroad transportation, bulk fuel storage and transfer, secondary lead smelting, lead fabrication, shipbuilding and metal plating. Warehouses, laboratories and office buildings have been located on the island. Approximately 70% of Harbor Island is covered with buildings, roads or other impervious surfaces.

The site was placed on the National Priorities List in 1983, due to elevated lead concentrations in soil, as well as elevated levels of other hazardous substances. The lead concentrations were due to a lead smelter on the island, which ceased operations in 1984.

In 1994, EPA completed a remedial investigation (RI) of Harbor Island sediments. In 1995 a group of Potentially Responsible Parties conducted a Supplementary Remedial Investigation (SRI) of Harbor Island Sediments. On October 31, 1995, EPA began the public comment period on the cleanup alternatives for the contaminated sediments at the Todd and Lockheed Shipyards. The Proposed Plan, as well as the reports of the investigation, were released for public comment. The preferred remedy in the Proposed Plan is to dredge the most highly contaminated sediments and cap the remaining contaminants. The dredged sediments would be contained in an appropriate confined aquatic disposal site.

## **Background on Community Involvement**

As described above, the Proposed Plan for the cleanup of the shipyard sediments at the Harbor Island Superfund site was released on October 31, 1995. The public comment period ran from October 31 until January 2, 1996.

As part of the comment period, a public meeting was held on December 6, 1995. About 5 people attended the meeting. No one gave public comment. A copy of the transcript is available at the Region 10 Records office in the Park Place Building, 1200 West 6th Avenue.

Comments received in writing are included in the following summary.

## Comments and Responses

1. Comment: For the proposed cleanup action, a site-specific cleanup standard must be defined in consideration of the net environmental benefit, cost, and the engineering feasibility of different clean up alternatives, according to the provisions of the State Sediment Management Standards.

Response: The environmental benefits, costs, and feasibility of achieving both the SQS and the CSL for the Shipyard Sediment OU were estimated in the ROD. After comparing the cost-benefit of the SQS to the CSL, EPA selected the SQS as the site-specific cleanup standard. EPA believes that the selection of the SQS as the cleanup standard is justified because it provides the highest environmental benefit by reducing contaminant concentrations to levels which have no adverse effects on marine organisms, it is feasible to achieve the SQS using conventional dredging and capping technology, and the SQS can be achieved at a minimal cost increase compared to the cost of dredging to the CSL.

2. Comment: Capping aquatic lands of an active shipyard, such as Todd, present unique logistical concerns. The effects of prop scour, recontamination and future construction activities on the cap integrity will need evaluation. We ask that EPA consider the long and short-term land use plans of Todd and Lockheed property in designing the dredge and cap alternative. All effort must be made to limit the amount of material that may require disposal on state-owned aquatic land. Cap placement and design must take into account recolonization and habitat diversity to ensure that a functional habitat will develop.

Response: EPA agrees and will ensure that these concerns will be addressed during the remedial design.

3. Comment: If a nearshore disposal facility is constructed to contain dredged sediments, a habitat mitigation site would be required to replace habitat lost for the construction of this disposal facility. The current cost estimates for the remedial alternatives do not take into consideration the expense of mitigating for habitat loss due to remedial activities or habitat destruction due to the creation of a near shore disposal site. In addition, there is a limited number of areas in the Elliott Bay/Duwamish River system where mitigation of a near shore habitat can occur. Therefore, we would like to impress upon EPA the need for integration of remedial activities and habitat mitigation/restoration in the remedial design.

Response: At a minimum, the remedy will be fully compliant with the requirements of the Clean Water Act (CWA) Section 404. Also, one of the objectives of the remedial design will be to ensure that adverse impacts to the existing habitats due to remediation are minimized. Where required under the CWA Section 404, restoration, in addition to mitigation for remedial impacts, will be incorporated into the remedial design. If construction of a nearshore disposal facility is the selected disposal option, potential off-site habitat mitigation areas will be evaluated during the remedial design and the cost of required habitat mitigation will be determined. The cost of any off-site habitat mitigation will be in addition

to the current cost estimate for remediation. Prior to completing the remedial design, a habitat inventory in the shipyard sediments will also be conducted which will serve as a baseline for evaluating the success of the remedial and mitigation actions.

4. Comment: The Washington Department of Natural Resources leases several parcels of submerged aquatic lands within the proposed cleanup area and manages several parcels proposed for use as aquatic disposal sites. The loss of current or future revenue from aquatic lands at Harbor Island could impact the state's ability to fund habitat enhancement projects and other activities that benefit aquatic lands. As such, the remedial actions should be designed and implemented in a manner that allows state aquatic lands to continue functioning in the interest of the public trust and not preclude future water-dependent uses.

Response: The remedial actions will be designed and implemented in a manner that allows state aquatic lands to continue functioning in the interest of the public trust. The selected remedy would not impact navigation or other water-dependent uses because it would not decrease water depth on submerged aquatic land leased by the Department of Natural Resources to Todd Shipyards. In fact, over most of the cleanup area, the water depth would be increased because a minimum of 3 feet of sediment would be dredged and replaced by only 2 feet of clean sediment for the cap. If future use of these areas requires additional dredging to increase water depths, such dredging would have to comply with proper handling, testing, and disposal procedures necessary as required by all applicable state and federal environmental regulations.

5. Comment: Who will assume responsibility for monitoring and maintaining the containment cap and aquatic disposal site? What legal tool, consent decree or other, will EPA enter into with the responsible parties to ensure compliance and protect the state from assuming an unreasonable financial risk from future cleanup costs?

Response: EPA intends to negotiate a Consent Decree with the Potentially Responsible Parties (PRPs) which would require these PRPs to monitor and maintain the cap within the Shipyard Sediment OU and the confined disposal facility in which the dredged sediments are placed.

6. Comment: The placement of a cap could require land use restrictions and institutional controls which may limit actions to repair and maintain existing piers or conduct maintenance dredging. The department (DNR) may be statutorily limited in the types of restrictions it can place on state-owned lands.

Response: Restrictions on maintenance dredging may be necessary to prevent damage to the cap. EPA will work with DNR to identify the most appropriate type of restriction on state-owned lands.

7. Comment: The placement of a nearshore disposal facility in the nearshore area north of Todd Shipyards would prevent the use of this area by water-dependent uses and may impede

treaty protected fishing. Future dredging of the West Waterway to accommodate deeper draft vessels may be impeded by the placement of a confined aquatic disposal site in that waterway. However, if nearshore disposal facilities are sited at Terminal 91 or Slip 27 (owned by the Port of Seattle), there would be no impact to the current or future water-dependent uses in the Todd Shipyards area or in the West Waterway.

Response: EPA expects the PRPs to evaluate all potential disposal sites in the Elliott Bay area during the remedial design, including Terminal 91 and Slip 27.

8. Comment: The preferred alternative appears environmentally protective provided that adequate source control is achieved for operations at the Todd and Lockheed Shipyards. We are particularly concerned with the NPDES permitted discharges at Todd Shipyards and ensuring that sufficient source control has been achieved through the NPDES program.

Response: The selected remedy requires that a Source Control Report be submitted to EPA which certifies that all potential contaminant sources at Todd and Lockheed Shipyards, including those covered under NPDES permits, are adequately controlled prior to implementing the remedy.

9. Comment: In order to verify that a suitable habitat for benthic organisms is available, periodic monitoring for benthic abundance should be conducted in the shipyard sediments after placing the cap to ensure that a healthy benthic community is developing. Additionally, cap placement and engineering design must take into account recolonization and habitat diversity concerns to maximize the development of on-site habitat function, thus minimizing the need for off-site mitigation.

Response: Periodic monitoring of the benthic community after placement of the cap is required by this Record of Decision (ROD). The design and placement of the cap, including any required armoring, will take recolonization and habitat diversity into consideration to the maximum extent practical.

10. Comment: Biological effects data are available from the Supplementary Remedial Investigation (SRI) and from NPDES baseline sediment monitoring for portions of the area around Todd Shipyards identified in the proposed plan. One SRI station (HI-NS-14), which passed the biological criteria of the Sediment Management Standards, has been included within the Shipyard Sediment Operable Unit (OU). The SRI and NPDES data indicate that a significant portion of the Todd Shipyards sediment area identified for remediation in the Proposed Plan complies with the SMS and should not require cleanup according to these standards. These data demonstrate that collection of additional sediment characterization information is required before a defensible remediation plan can be established.

Response: The EBAP biological data demonstrated that the highest amphipod mortality and a decrease abundance in all four major benthic taxa occurred at a nearshore station at Todd Shipyards. The RI mussel results indicate that the highest bioaccumulation of

copper and zinc and the slowest growth rate in juvenile mussels also occurred at a nearshore station at Todd Shipyards. Two SRI stations sampled for biological effects at Todd Shipyards failed the biological SQS, which is the site-specific cleanup standard for the Shipyard Sediment OU. EPA believes the EBAP, RI, and SRI biological data, together with the RI and SRI chemical data for Todd and Lockheed Shipyard sediments, support the decision to select a remedial action for the Shipyard Sediment OU without collecting additional data prior to issuing this ROD. However, since SRI biological tests did not provide comprehensive coverage of the Shipyard Sediment OU, additional biological tests will be allowed during remedial design to more accurately define the areas which require remediation.

11. Comment: EPA attempts to support the proposed cleanup action by using the results of a mussel study described in the RI report. Although copper and zinc were found in mussels from the Todd Shipyards area, and juvenile mussel growth was relatively slow in this area, the data do not provide direct evidence that the sediment was the source of the accumulated constituents, that the measured growth effects were caused by the sediment, or that the constituents in the sediment were actually bioavailable.

Response: The shipyard sediment areas were identified for remediation because RI and SRI sediment chemical data demonstrate that these areas exceeded the chemical CSL for several contaminants, and because EBAP and SRI biological data demonstrate that several stations within the Shipyard Sediment OU fail the biological SQS. Furthermore, the RI mussel study found a strong correlation between sediment contaminant concentrations, tissue contaminant concentrations, and mussel growth, as stated in this passage from the study:

"By using transplanted mussels, we demonstrated that combining mussel growth, tissue chemistry, and sediment chemistry was effective in differentiating areas of contamination and potential bioeffects. . . . We were able to show an association between toxicity-normalized tissue and sediment concentrations. There was a statistically significant relationship between mussel growth and both tissue and sediment chemistry, and mussels accumulated many of the contaminants measured in sediments."

12. Comment: The need for a separate shipyard sediment operable unit or immediate action in those areas cannot be supported for the following reasons:

- a) EPA is unable to quantify or attribute risk to human health via the most significant exposure pathway (seafood ingestion) to any specific location around Harbor Island, including Todd Shipyards,
- b) The RI demonstrates that cancer and non-cancer risks to human health by ingestion of and dermal contact with contaminated sediment are not significant,
- c) Available site-specific ecological effects data, if interpreted consistently, do not justify remedial action in the Shipyard Sediment OU, and
- d) The mussel study results have some acknowledged inherent weaknesses that nullify their usefulness for preparing a site-specific risk assessment.

Response: a) Demonstration of an increased human health risk or adverse biological effects in marine organisms can trigger a remedial action for sediments. Evidence for adverse biological effects occurring in the shipyard sediments was found during the EBAP study and the RI mussel study (see response #10). The potential for increased human health risk due to consumption of Elliott Bay/Harbor Island seafood is documented in the study, "Health Risk Assessment of Chemical Contamination in Puget Sound Seafood" (Tetra Tech, 1988). Although this risk assessment was not specific to the shipyard sediments, it demonstrated that high concentrations of carcinogenic contaminants (primarily PCBs) in seafood caught around Harbor Island can cause increased human health cancer risks. Since concentrations of PCBs are especially high in the sediments at Todd Shipyards, it is likely that these sediments contribute to the overall elevated human health risk due to seafood consumption.

b) The human health risk due to ingestion and dermal contact with contaminated sediment was found to be insignificant and was not used to determine areas of remediation.

c) EPA believes that the EBAP biological data and the RI mussel data together provide adequate preponderance of evidence that contaminants in the shipyard sediments are associated with adverse biological effects in marine organisms (see responses to #10 and #11).

d) EPA does not agree that there are weaknesses in the mussel study results which would nullify their usefulness in assessing adverse biological effects due to sediment contamination. In fact, the mussel study found a strong correlation between sediment contaminant concentrations, tissue contaminant concentrations, and mussel growth (see response to #11).

13. Comment: The proposed plan does not take into account the available information from the RI and SRI on natural recovery of contaminated sediment areas around Harbor Island. Incorporation of natural recovery processes into the development of cleanup standards may significantly reduce sediment areas that exceed the CSLs.

Response: The RI sediment accumulation rate data (Pb-210 profile) from the Todd Shipyards area were inconclusive and can not be used to determine sediment accumulation rates. The natural recovery modeling conducted in the SRI Base Level Data Interpretation Report relies on an optimistic assumption (50% reduction in contaminants in particulates from off-site sources) which is not realistic. Without this assumption, there would be no significant natural recovery over a ten year period (as required by the Sediment Management Standards) of mercury and PCB, which are two contaminants of primary concern in Harbor Island shipyard sediments.

14. Comment: Sources of contamination around Harbor Island are not adequately controlled to justify the immediacy of the proposed plan. Any cleanup of sediment around Todd Shipyards, if ultimately necessary, should be appropriately integrated with the timing of cleanup actions in the remainder of the sediment operable unit.

Response: EPA believes that the primary source of contaminants to the shipyard sediments is direct discharge of waste as a result of past operations at Todd and Lockheed Shipyards. As such, the most immediate concern will be to assure that all contaminant sources at the shipyards are adequately controlled before implementing the shipyard sediment remedy. The remedy requires that a Source Control Report for Todd and Lockheed Shipyards be submitted to EPA verifying that all potential contaminant sources at these shipyards are controlled prior to implementing the remedy. EPA intends to further evaluate the need for remedial action in the surrounding contaminated Harbor Island sediments. However, EPA is convinced that contaminants in the Shipyard Sediment OU are associated with significant adverse biological effects in marine organisms, and therefore, EPA does not want to delay remediation of the shipyard sediments until a remedial action is selected for the remainder of the Harbor Island sediments.

15. Comment: As a point of clarification, the highest concentration of PCBs in sediments reported in the RI is in the East Waterway, not near Todd Shipyards as stated in the Proposed Plan.

Response: EPA agrees. The second highest concentration of PCBs occurs in the West Waterway next to Todd Shipyards.

16. Comment: Although it is recognized that the cost estimates provided in the Proposed Plan and supporting technical memorandum are general and for purposes of alternative comparison, certain components of the estimates may be high. Two of the assumptions (rapid sediment settling and no treatment necessary for dredging water) appear unrealistic and significantly higher costs would result if either assumption turns out to be incorrect. Sediment disposal costs, which are already a significant component of the cost estimates, are understated because neither confined aquatic disposal nor nearshore disposal is available now or in the foreseeable future, and upland disposal is expected to be more costly than identified in the Proposed Plan due to the lack of potentially available sites near Harbor Island.

Response: If assumptions for sediment settling and treatment for dredged water are not correct, EPA agrees that costs for these components of the remedy will be higher. However, EPA disagrees that potential confined aquatic disposal sites are available near Harbor Island. In the Harbor Island Sediment Feasibility Study, several potential confined nearshore and aquatic disposal sites were identified. In addition, Todd Shipyard has recently proposed using a portion of the slips at its shipyard as a site for a confined nearshore disposal facility. It is EPA's expectation that the PRPs will further investigate and evaluate these potential sites during remedial design.

17. Comment: The mechanics of dredging will inevitably result in resuspension and spreading of contaminated sediment if dredging is performed according to the Proposed Plan. Because the more recent sediment accumulations are less contaminated, the issue of sediment resuspension during dredging must be seriously evaluated against the perceived benefit of sediment removal versus natural recovery of contaminated areas.

Response: It is anticipated that a variety of dredging technologies will be evaluated in the remedial design. Minimizing the release and resuspension of contaminated sediment will be a major factor in the selection of the dredging technology which will be used for dredging hot spot sediments. EPA does not agree that natural recovery will accomplish reduction of shipyard contaminants within a reasonable timeframe (see response #13).

18. Comment: While EPA acknowledges that there are not enough data at this time to properly evaluate human health risks, the Proposed Plan nevertheless identifies human health protection as one of the primary goals of the proposed remediation. It is arbitrary and capricious for EPA to base a cleanup on human health risk in the absence of sufficient data to evaluate such risk.

Response: Protecting marine organisms from adverse biological effects is the primary objective for cleaning up the shipyard sediments. EPA believes that the EBAP biological effects data and the RI mussel study provide a preponderance of evidence that shipyard sediments are associated with adverse biological effects. Some protection of human health may also be achieved by eliminating high levels of PCBs found in sediments at Todd Shipyards (see response to #12a).

19. Comment: Source evaluation data presented in EPA's Remedial Investigation and Feasibility Study of the Harbor Island Site, along with more recent data collected as part of the Supplementary Remedial Investigation, suggest that there are ongoing inputs of contaminants to the Site which could potentially recontaminate sediments following a remedial action. There are insufficient data available to conclude that adequate source control of contamination resulting from resuspension of upstream sediments, discharges from storm drains and outfalls, and release of bottom paint chemicals from vessels during berthing and other in-waterway activities, is in place at this time to move ahead with remedial action, either within the Shipyard Sediments OU or in the marine sediment portion of the Site as a whole.

Response: Sediment data indicate that most of the contamination found in the shipyard sediments is due to the direct release of waste containing copper, lead, mercury, TBT, and zinc from shipyard operations. As such, the most immediate concern prior to implementing the remedy will be the assurance that potential sources at Todd and Lockheed Shipyards have been adequately controlled. In regard to other sources:

a) EPA does not regard stormdrains on Harbor Island to be a significant ongoing source of contamination. All public stormdrains on Harbor Island were cleaned by the City of Seattle in 1990 and stormdrain catch basins are periodically cleaned by the City. The City will also be expected to monitor ongoing discharges from these stormdrains under the requirements of an NPDES permit to assure that ongoing discharges meet water quality standards and are protective of marine sediments. In addition, EPA sampled all private stormdrains on Harbor Island and found that there was no significant loading of contaminants from these drains.

b) Based on EBAP and RI sediment data, contaminant concentrations in upstream sediments are generally below the chemical SQS, and are significantly below contaminant concentrations in sediments around Harbor Island. Therefore, the only contaminated sediments with the potential to recontaminate the cap in the Shipyard Sediment OU are remaining contaminated sediments around Harbor Island. EPA is evaluating the need to take remedial action on these remaining contaminated sediments at Harbor Island, and will issue its decision in a future Record of Decision.

c) As for release of contaminants from vessels, it is possible that some of the contamination in Harbor Island sediments is due to hazardous substances in paint chips released from vessels during berthing and other in-water activities. However, data indicate that most of the contamination found in the shipyard sediments is due to the direct release of waste from shipyard operations.

20. Comment: The need for remedial action at the Shipyard Sediments OU, as set forth by EPA in the Proposed Plan, is apparently based on determinations by EPA that contaminants present in the shipyard sediments are bioaccumulating in marine organisms at concentrations which can cause adverse biological effects. Our evaluation suggest that contaminant bioaccumulation observed in the caged mussel study was relatively limited and attributable to ongoing inputs from upland or over-water activities. Transfer of contaminants from surface sediments does not appear to have been a significant factor contributing to observed bioaccumulation.

Response: EPA acknowledges that there may be ongoing upstream and over-water sources of bioaccumulating contaminants. However, EPA does not regard upstream and over-water sources to be a significant source of ongoing contamination (see response #19). EPA believes that the contaminants in the shipyard sediments are a likely source of bioaccumulating contaminants due to a correlation between contaminants in sediments, mussel tissue, and mussel growth rates (see response #11).

21. Comment: There are a number of critical deficiencies associated with EPA's segregation of operable units which will substantially limit the overall effectiveness of site-wide remediation because: a) risk management of contaminated sediments within the Harbor Island Site is more appropriately addressed on a Site-wide basis, and b) remedial design in either the channel or nearshore areas will require an understanding of the design approach being taken in the other sediment areas.

Response: a) The Shipyard Sediment OU is distinct from other contaminated Harbor Island sediments because it has the highest concentrations of copper, lead, mercury, TBT, and zinc, all of which are hazardous substances released from the shipyards. The high concentrations of these contaminants in the Shipyard Sediment OU are likely associated with the most significant adverse biological effects in marine organisms at Harbor Island. Also, contaminants in the Shipyard Sediment OU may be a source of contamination to surrounding sediments. Establishing the Shipyard Sediment OU as a separate OU, and remediating this

OU, will allow an incremental reduction in the adverse biological effects, and will prevent further release of contamination from this OU. The concept of reducing risks incrementally by establishing separate OUs to address unique wastes or hot spots, is consistent with the definition of an operable unit in the National Contingency Plan (NCP).

b) EPA intends to further study the surrounding Harbor Island contaminated sediments and determine if these sediments require remediation before completion of the shipyard sediment remedial design. To the extent practical, the remedy for the shipyard sediments will be consistent with the remedy required for the surrounding Harbor Island sediments.

22. Comment: EPA should take a comprehensive and coordinated approach to disposal facility siting and habitat mitigation so as to meet Superfund objectives throughout Elliott Bay. Such an approach would result in cost savings through economics of scale and reduced monitoring requirements.

Response: EPA is working with the Corps of Engineers, Ecology, and other agencies to identify a multi-user disposal facility in the Elliott Bay area. However, it not anticipated that a such a multi-user facility, if a suitable site if found in Elliott Bay, would be available until the year 2001, at the earliest. Since dredging and disposal of the Harbor Island shipyard sediments could occur as soon as 1998 or 1999, a multi-user disposal facility may not be available soon enough to receive these sediments.

23. Comment: EPA's Technical Memorandum states that the non-under pier sediments will be removed hydraulically. We believe that unless a nearshore fill site is the confined disposal site, mechanical dredging may be the more economical and environmental preferred means of removal.

Response: The dredging methods will be selected during remedial design based on criteria which include: minimal adverse impacts to water quality, cost-effectiveness, dredging depths, and accessibility to dredging equipment.

24. Comment: To effectively remove 3 feet of sediments at the Lockheed Shipyard, the dredging contractor will need to overdredge up to 1 foot, based on the accuracy of their equipment. This will increase the estimated dredging volume from 16,000 cubic yards (CY) to roughly 19,000 CY. If underpier sediments are also impacted, it would be reasonable to expect a 50 to 80 percent increase in overall removal volumes.

Response: Current estimated dredging depths are conservative but some overdredging may be required. Such overdredging may increase dredged sediment volume by as much as 15-20%. The extent of dredging under piers will be determined during remedial design after considering the depth to the chemical CSL under the piers, effects of dredging on pier stability, the potential environmental benefit of dredging under piers, and the cost of dredging under piers.

25. Comment: The most cost-effective means to accomplish sediment removal or confinement of under-pier sediments will vary depending on sediment thickness and extent beneath the pier, pier construction, and long-term plans for the pier. Currently, there are four options available, including:

- a) Hydraulic dredging between the piling and under the pier,
- b) Removing the pier decking, mechanically dredging the sediments, and replacing the decking,
- c) Jetting the sediments from under the pier to open water and mechanically removing the sediments, and
- d) Capping the sediments in place.

Response: All feasible methods of removing or containing contaminated under-pier sediments, including the above four methods, will be evaluated during the remedial design. The method which can remove the under-pier sediments most cost-effectively, and minimize release of contaminants to the surrounding environment, would be selected by EPA after the evaluation is completed.

26. Comment: We believe that the selection of a preferred alternative is, in fact, premature pending clarification of Todd Shipyards's future dredging plans. Todd Shipyards may desire to dredge within the proposed remediation area in order to accommodate larger vessels. It would seem reasonable to design an alternative which would accommodate future needs and avoid additional disturbances within the remediated area.

Response: The selected alternative (alternative 4) would not have an adverse impact on current operations at Todd Shipyards because it would maintain current sediment depths in the slips and would not require a reduction in the size of vessels which enter these slips. After the selected remedy is constructed, the only future disturbances of the habitat in the Shipyard Sediment OU would be periodic maintenance of the cap, which is expected to have a minor, short-term impact on the habitat. One of the alternatives considered for Todd Shipyards, Alternative 3, would have required dredging all contaminated sediments above the SQS cleanup goals and would not have required a containment cap. This alternative was considered to be the most compatible with future shipyard use because it would allow Todd Shipyards to service vessels larger than the current maximum size. Based on remedial investigation data, Alternative 3 is the least cost-effective alternative because it would require dredging a significantly larger volume of sediments than the preferred alternative. However, Alternative 3 has been identified as a contingent remedy if it is demonstrated to be more cost-effective than Alternative 4 based on remedial design data.

27. Comment: It appears that the best way to predict what will happen to the remaining contaminants after capping under Alternatives 2 and 4 is to study core samples of what is currently in place. It may be that capping the existing sediments without performing any major excavation is a better, long term, solution than exposing the materials to aerobic waters that will liberate more metal ions. A preferable scenario is to decompose the organic

constituents of the sediment by land farming followed by suitable additives and anoxic conditions to promote heavy metal insolubility.

Response: Capping sediments without major excavation was evaluated in Alternative 2 of the Proposed Plan. This alternative was rejected because it leaves the highest levels of contaminants in place with the potential for future release to the environment if the cap is eroded by ship traffic, storms, or other natural forces. This alternative would not work well at Todd Shipyards where ships are constantly docking and there is a potential for cap erosion due to prop-wash. Also, capping alone would potentially require restriction on future use of slips on the north side of Todd Shipyards because it would increase bottom depths in this area.

Landfarming may work well for decomposing organic contaminants in the sediments but would require a large open area on the site for several months to spread out and aerate the sediments. Such an open area is not available on Harbor Island. Also, landfarming has been demonstrated not to be very effective at decomposing more complex organics such as PCBs, which are present in the shipyard sediments. As for metals, the shipyard sediments contain copper, lead, mercury, tributyl tin, and zinc. The use of additives and anoxic conditions may not be successful in converting all these metals to insoluble forms. Also, this technique is experimental in nature and has not yet been proven in a full-scale application.

28. Comment: It appears that additional sediment testing of mercury species, concentration, and bioaccumulation effects may be required to determine the sources of mercury contamination, the significance of anthropogenic contributions, and the effect upon marine organisms of the bioaccumulation of sediment mercury.

Response: EPA does not intend to further investigate sources of mercury contamination because evidence indicates that mercury in Harbor Island sediments comes primarily from marine paints used on ships. In particular, sediment data indicate that the highest concentration of mercury in Harbor Island sediments occur at Todd Shipyards. Ship repair and maintenance activities at Todd Shipyards, which involved removing paint by sandblasting, were likely the source of mercury found in sediments at Todd Shipyards.

As for the bioaccumulation of mercury in marine organisms, the mussel bioaccumulation study conducted during the Harbor Island RI showed that mercury concentrations in all mussel samples were at or below the detection level, indicating that mercury does not significantly bioaccumulate in mussels. In addition, benthic bioassay methods required by the Sediment Management Standards are intended to test for acute and chronic toxicity due to mercury.

29. Comment: The National Contingency Plan (NCP) requires that EPA identify operable units during the scoping stage early on in the RI/FS process. The NCP requires that EPA adequately address source control prior to any active remediation. The NCP also provides that operable units should not be inconsistent with nor preclude implementation of the final remedy.

Response: a) The NCP does not require that EPA identify operable units during the scoping stage.

b) Evidence indicates that Todd and Lockheed Shipyards were the most significant sources of contamination to the shipyard sediments. Sources at these shipyards will be adequately controlled prior to cleaning up the shipyard sediments (see response to #19).

c) The remedy selected in this ROD will be the final remedy for the Shipyard Sediment OU. To the extent possible, the remedy for this OU will be designed so that it does not preclude any appropriate remedies for the surrounding Harbor Island sediments.

30. Comment: Counsel for Todd Shipyards Corporation (Todd) submitted lengthy comments arguing the Proposed Plan violates the National Environmental Policy Act (NEPA) and is inconsistent with the National Contingency Plan (NCP), the regulations promulgated by EPA under CERCLA. Todd noted that the U.S. Army Corps of Engineers (Corps) announced its intent in December 1995, as a lead agency, to prepare a Programmatic Environmental Impact Statement (EIS) in accordance with NEPA, to assess the environmental impacts of one or more multiuser disposal facilities in Puget Sound for the disposal of contaminated sediments. Todd then argued that until that EIS is completed, any and all dredging and disposal of contaminated sediments for environmental cleanup, navigational, or other purposes, with narrow exceptions, should be delayed because it will be inconsistent with, and consequently undermine, the Corps' effort. Todd stated that "EPA staff have indicated that it may be 2002 before the analysis is complete."

It should be noted that since the submittal of these comments, Todd has proposed using a portion of the slips it owns in the West Waterway for a confined nearshore disposal facility. Such a facility could contain all sediments dredged from the Todd Shipyards portion of the Shipyard Sediment OU. If this disposal facility is implemented, and all indications are that it should be implementable, off-site disposal of sediments dredged from Todd Shipyards may no longer be an issue. However, counsel for Todd indicated that the comments were not being withdrawn, notwithstanding that issues to which they are primarily addressed seem likely not to be reached.

Response: EPA believes that Todd's arguments regarding any alleged violation of NEPA, or inconsistency with the NCP, are without merit. The establishment of one or more large multiuser disposal facilities in Puget Sound for contaminated sediments is a joint goal of the Corps, which is responsible for navigational dredging of navigable waters of the United States, many of which are contaminated, EPA, the Washington State Departments of Ecology and Natural Resources, and others in both the public and private sectors, including the Washington Public Ports Association, who have been meeting and working regularly in a spirit of partnership to resolve the complex issues facing the kind of multiuser facility the EIS will analyze for environmental impacts. It should be emphasized that such a multiuser disposal facility does not exist anywhere in the United States, despite a recognized need in many areas, including Puget Sound, the Great Lakes, the Mississippi Delta and Gulf of

Mexico generally, the Florida Everglades, and East Coast major port cities such as New York, Boston, and others, which have very large quantities of contaminated sediments and billions of dollars in water dependent industries. There is no guarantee that funding, management, technical design and feasibility, siting, environmental, and other issues related to the realization of one or more large multiuser disposal facilities in Puget Sound or any other major American waterway be resolved in the next ten, twenty, or even fifty years. At the very least, operational capacity for such a facility is certain not to occur for several years.

Todd has argued that cleanup of significantly contaminated sediments adjacent to its shipyard on Harbor Island, which come from its sandblasting and other shipbuilding activities, must await the result of what Todd readily acknowledges will be a very lengthy study, or the hopes and plans of the Corps and others, including EPA, for Puget Sound will be compromised and undermined. Todd's apparent interest in deferring its cleanup expenses has led its counsel to argue that NEPA, whose purpose is to evaluate environmental effects of major federal activities, can be used to block a comparatively small scale, uncomplicated environmental cleanup under Superfund. It has argued that the dredging and disposal of its infinitesimal percentage of total Puget Sound contaminated sediments, is not only "directly contrary" to the grand design of a large multiuser disposal facility, but will "make a mockery (and) charade" of the public comment process under NEPA, notwithstanding that every remedial action decision by EPA, including this ROD, has been subject to public comment.

Todd counsel's hyperbole continued in the NCP inconsistency arguments. For example, it is stated on Todd's behalf that; "Incredibly, the agency's sole rationale for creating a new operable unit is that remedial action can now proceed within the Shipyard Sediment Operable Unit because no biological data exist to override the existing chemical data." This argument makes reference to the Washington State Sediment Management Standards under which chemical concentration data for contaminants in sediments above specified levels triggers the need for sediment cleanup action, unless biological data from such sediments indicates that the chemical concentrations are not having biological impacts (perhaps, for example, because the contaminants are bound together in a manner which makes them unavailable to marine organisms in the sediment environment).

As has been described elsewhere above, in 1995, after EPA completed its remedial investigation of Harbor Island sediments, a group of potentially responsible parties, including Todd, entered into a Consent Order with EPA to conduct biological testing of many Harbor Island sediment areas where chemical data EPA had collected indicated cleanup might be necessary. Todd elected not to perform such biological tests on the sediments next to its shipyard (which are the subject of this ROD as it would affect Todd) because, as Todd's representatives told EPA, they did not think the biological tests would remove these sediments from the areas needing remediation. Todd felt the expense of the biological tests would be wasted.

Todd may have made this decision not to perform further biological tests because there are, in fact, biological effects data indicating that adverse biological effects occur in these sediments. The EBAP investigation revealed two stations at Todd Shipyards which failed the biological CSL. In addition, two test stations in the area of Todd Shipyards which were tested by responsible parties in 1995, failed the biological SQS, which is the site-specific cleanup standard for the Shipyard Sediment OU. Based on the combined EBAP and SRI biological data, EPA believes there is adequate evidence of adverse biological effects at Todd Shipyards to include this area in the Shipyard Sediment OU. However, because the current biological effects data within the Shipyard Sediment OU are not comprehensive, EPA will allow Todd to conduct additional biological testing during the remedial design phase of the cleanup to more accurately define sediment areas which requiring remediation.

With respect to other sediments around Harbor Island, as a result of the biological data collected in 1995, which revealed less biological impact than EPA and Ecology anticipated, and other factors, EPA has decided more study is needed to determine what remedial action, if any, should be taken. Ecology, among others, has vigorously urged more study of bioaccumulation effects of sediment contaminants in the food chain within Puget Sound, and EPA is evaluating the best ways to address these concerns. There remained, however, no basis to delay cleanup of the shipyard sediments. Consequently, EPA decided to make separate operable units for sediments warranting further evaluation before the expense of remediation would be undertaken, and those where delay for further study was not warranted. Todd's argument that: "At the risk of stating the obvious, the NCP does not include 'lack of data' as a rationale for the creation of new operable units or accelerated cleanup schedules," misstates EPA's rationale. While it may well be understandable that Todd would like to defer if not eliminate its cleanup costs, EPA finds that no valid argument has been presented for allowing it to do so.

**APPENDIX B**  
**ALTERNATIVE COST ESTIMATE TABLES**

Table 1- Northwest Harbor Island Alternative 2- Containment

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Dredging</b>				
<b>A. Dredging</b>				
Dredging Mobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	45198	\$1.50	\$67,797
Dredging, Hydraulic Volume	CY	45198	\$2.00	\$90,396
<b>B. Disposal</b>				
Disposal Volume (20% expansion)	CY	54238		
Nearshore Disposal	CY	54238	\$30.00	\$1,627,128
<b>C. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	4	\$3,300.00	\$13,200
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>2. Nearshore Capping</b>				
<b>A. Cap</b>				
Silty Sand	CY	160022	\$3.00	\$480,066
Transport and Placement	CY	160022	\$3.00	\$480,066
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	13	\$900.00	\$11,700
Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1 and 2)				\$3,140,353
Engineering Costs ( % of Construction Costs)	%	15		\$471,053
Contingency Allowances (% of Construction Costs)		10		\$314,035
Total Construction Costs				\$3,925,441
<b>3 Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>4 Maintenance</b>	LS	1	\$500,064.60	\$500,065
Subtotal O&M Costs (Items 3 and 4)				\$843,039
Administrative Costs (% of O&M Costs)	%	15		\$126,456
Total O&M Costs				\$969,494
SUBTOTAL				\$4,894,936
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$4,895,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 2- West Waterway Alternative 2-Containment

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Areas</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	20512	\$1.50	\$30,768
Volume (hydraulic)	CY	20512	\$2.00	\$41,024
<b>B. Cap</b>				
Silty Sand	CY	22791	\$3.00	\$68,373
Transport and Placement	CY	22791	\$3.00	\$68,373
<b>C. Disposal</b>				
Disposal Volume (20% expansion)	CY	24614		
Nearshore Disposal	CY	24614	\$30.00	\$738,432
<b>D. Short-term Monitoring - Dredging</b>				
Water Quality Monitoring	DAY	2	\$3,300.00	\$6,600
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>E. Short-term Monitoring - Capping</b>				
Water Quality Monitoring	DAY	2	\$900.00	\$1,800
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1)				\$1,325,370
Engineering Costs ( % of Construction Costs)	%	15		\$198,806
Contingency Allowances (% of Construction Costs)		10		\$132,537
Total Construction Costs				\$1,656,713
<b>2. Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>3. Maintenance</b>	LS	1	\$113,910.08	\$113,910
Subtotal O&M Costs (Items 2 and 3)				\$456,884
Administrative Costs (% of O&M Costs)	%	15		\$68,533
Total O&M Costs				\$525,417
SUBTOTAL				\$2,182,129
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$2,182,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 3- Northwest Harbor Island Alternative 3- Dredge to SQS

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Areas</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	204978	\$1.50	\$307,467
Dredging, Hydraulic Volume	CY	204978	\$2.00	\$409,956
Confirmation Sampling	1/4000 CY	51	\$1,000.00	\$51,000
<b>B. Disposal</b>				
Disposal Volume (20% expansion)	CY	245974		
Nearshore Disposal	CY	245974	\$30.00	\$7,379,208
<b>C. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	17	\$3,300.00	\$56,100
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>Subtotal Construction Costs (Items 1)</b>				<b>\$8,538,731</b>
<b>Engineering Costs ( % of Construction Costs)</b>	<b>%</b>	<b>15</b>		<b>\$1,280,810</b>
<b>Contingency Allowances (% of Construction Cost)</b>		<b>10</b>		<b>\$853,873</b>
<b>Total Construction Costs</b>				<b>\$10,673,414</b>
<b>SUBTOTAL</b>				<b>\$10,673,414</b>
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$10,673,000</b>

The cost of this alternative is highly subject to change based on results from future preredial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 4- West Waterway Alternative 3- Dredge to SQS

Description	Unit	Quantity	Unit Cost	Cost
1. Entire Cleanup Area				
A. Dredging				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	31817	\$1.50	\$47,726
Dredging, Hydraulic Volume	CY	31817	\$2.00	\$63,634
Confirmation Sampling	1/4000 CY	8	\$1,000.00	\$8,000
B. Disposal				
Disposal Volume (20% expansion)	CY	38180		
Nearshore Disposal	CY	38180	\$30.00	\$1,145,412
C. Short-term Monitoring				
Water Quality Monitoring	DAY	3	\$3,300.00	\$9,900
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1)				\$1,609,672
Engineering Costs ( % of Construction Costs)	%	15		\$241,451
Contingency Allowances (% of Construction Costs)		10		\$160,967
Total Construction Costs				\$2,012,089
SUBTOTAL				\$2,012,089
TOTAL PRESENT WORTH VALUE				\$2,012,000

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 5- Northwest Harbor Island Alternative 4- Dredge to CSLs and Cap

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Dredging</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	116415	\$1.50	\$174,623
Volume (hydraulic)	CY	116415	\$2.00	\$232,830
Confirmation Sampling	1/4000 CY	29	\$1,000.00	\$29,104
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	10	\$3,300.00	\$33,000
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>C. Disposal</b>				
Disposal Volume (20% expansion)	CY	139698		
Nearshore Disposal	CY	139698	\$30.00	\$4,190,940
<b>2. Nearshore Area Capping</b>				
<b>A. Cap</b>				
Silty Sand	CY	80011	\$3.00	\$240,033
Transport and Placement	CY	80011	\$3.00	\$240,033
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	7	\$900.00	\$6,300
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1 and 2)				\$5,516,862
Engineering Costs ( % of Construction Costs)	%	15		\$827,529
Contingency Allowances (% of Construction Costs)		10		\$551,686
Total Construction Costs				\$6,896,078
<b>3 Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>4 Maintenance</b>	LS	1	\$500,064.60	\$500,065
Subtotal O&M Costs (Items 3 and 4)				\$843,039
Administrative Costs (% of O&M Costs)	%	15		\$126,456
Total O&M Costs				\$969,494
<b>SUBTOTAL</b>				<b>\$7,865,572</b>
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$7,866,000</b>

The cost of this alternative is highly subject to change based on results from future preredial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 6- West Waterway Alternative 4- Dredge to CSLs and Cap

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Cleanup Area - Dredging</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	18153	\$1.50	\$27,230
Dredging, Hydraulic Volume	CY	18153	\$2.00	\$36,306
Confirmation Sampling	1/4000 CY	5	\$1,000.00	\$4,538
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	2	\$3,300.00	\$6,600
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>C. Disposal</b>				
Disposal Volume (20% expansion)	CY	21784		
Nearshore Disposal	CY	21784	\$30.00	\$653,508
<b>2. Cleanup Area - Capping</b>				
<b>A. Cap</b>				
Silty Sand	CY	11395	\$3.00	\$34,185
Transport and Placement	CY	11395	\$3.00	\$34,185
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	1	\$900.00	\$900
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1 and 2)				\$1,167,452
Engineering Costs ( % of Construction Costs)	%	15		\$175,118
Contingency Allowances (% of Construction Costs)		10		\$116,745
Total Construction Costs				\$1,459,315
<b>3 Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>4 Maintenance</b>	LS	1	\$113,910.08	\$113,910
Subtotal O&M Costs (Items 3 and 4)				\$456,884
Administrative Costs (% of O&M Costs)	%	15		\$68,533
Total O&M Costs				\$525,417
SUBTOTAL				\$1,984,731
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$1,985,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 7-Northwest Harbor Island Alternative 2- Containment with Onsite Nearshore Disposal

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Dredging</b>				
<b>A. Dredging</b>				
Dredging Mobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	45198	\$1.50	\$67,797
Dredging, Hydraulic Volume	CY	45198	\$2.00	\$90,396
<b>B. Disposal</b>				
Disposal Volume (20% expansion)	CY	54238		
Onsite Nearshore Disposal	CY	54238	\$16.00	\$867,802
<b>C. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	4	\$3,300.00	\$13,200
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>2. Nearshore Capping</b>				
<b>A. Cap</b>				
Silty Sand	CY	160022	\$3.00	\$480,066
Transport and Placement	CY	160022	\$3.00	\$480,066
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	13	\$900.00	\$11,700
Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1 and 2)				\$2,381,027
Engineering Costs ( % of Construction Costs)	%	15		\$357,154
Contingency Allowances (% of Construction Costs)		10		\$238,103
Total Construction Costs				\$2,976,283
<b>3 Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>4 Maintenance</b>	LS	1	\$500,064.60	\$500,065
Subtotal O&M Costs (Items 3 and 4)				\$843,039
Administrative Costs (% of O&M Costs)	%	15		\$126,456
Total O&M Costs				\$969,494
SUBTOTAL				\$3,945,778
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$3,946,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 8-Northwest Harbor Island Alternative 3- Dredge to SQS with Onsite Nearshore Disposal

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Areas</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	204978	\$1.50	\$307,467
Dredging, Hydraulic Volume	CY	204978	\$2.00	\$409,956
Confirmation Sampling	1/4000 CY	51	\$1,000.00	\$51,000
<b>B. Disposal</b>				
Disposal Volume (20% expansion)	CY	245974		
Onsite Nearshore Disposal	CY	140000	\$16.00	\$2,240,000
Offsite Nearshore Disposal	CY	105974	\$30.00	\$3,179,208
<b>C. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	17	\$3,300.00	\$56,100
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>Subtotal Construction Costs (Items 1)</b>				<b>\$6,578,731</b>
<b>Engineering Costs ( % of Construction Costs)</b>	<b>%</b>	<b>15</b>		<b>\$986,810</b>
<b>Contingency Allowances (% of Construction Cost)</b>		<b>10</b>		<b>\$657,873</b>
<b>Total Construction Costs</b>				<b>\$8,223,414</b>
			<b>SUBTOTAL</b>	<b>\$8,223,414</b>
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$8,223,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

Table 9-Northwest Harbor Island Alternative 4- Dredge to CSLs (with Onsite Nearshore Disposal) and Cap

Description	Unit	Quantity	Unit Cost	Cost
<b>1. Nearshore Dredging</b>				
<b>A. Dredging</b>				
Dredging Mobilization/Demobilization	LS	1	\$300,000.00	\$300,000
Transport and Placement (Pipeline)	CY	116415	\$1.50	\$174,623
Volume (hydraulic)	CY	116415	\$2.00	\$232,830
Confirmation Sampling	1/4000 CY	29	\$1,000.00	\$29,104
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	10	\$3,300.00	\$33,000
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
<b>C. Disposal</b>				
Disposal Volume (20% expansion)	CY	139698		
Onsite Nearshore Disposal	CY	139698	\$16.00	\$2,235,168
<b>2. Nearshore Area Capping</b>				
<b>A. Cap</b>				
Silty Sand	CY	80011	\$3.00	\$240,033
Transport and Placement	CY	80011	\$3.00	\$240,033
<b>B. Short-term Monitoring</b>				
Water Quality Monitoring	DAY	7	\$900.00	\$6,300
Bathymetric/Sed. Profile Surveys	LS	1	\$35,000.00	\$35,000
Subtotal Construction Costs (Items 1 and 2)				\$3,561,090
Engineering Costs ( % of Construction Costs)	%	15		\$534,164
Contingency Allowances (% of Construction Costs)		10		\$356,109
Total Construction Costs				\$4,451,363
<b>3 Long-term Monitoring</b>	LS	1	\$342,974.00	\$342,974
<b>4 Maintenance</b>	LS	1	\$500,064.60	\$500,065
Subtotal O&M Costs (Items 3 and 4)				\$843,039
Administrative Costs (% of O&M Costs)	%	15		\$126,456
Total O&M Costs				\$969,494
SUBTOTAL				\$5,420,857
<b>TOTAL PRESENT WORTH VALUE</b>				<b>\$5,421,000</b>

The cost of this alternative is highly subject to change based on results from future preremedial design investigations. This is provided as a relative measure from which to compare the costs of different alternatives.

**APPENDIX C**  
**ADMINISTRATIVE RECORD INDEX**

**TABLE OF CONTENTS**  
**HARBOR ISLAND - Shipyard Sediments Administrative Record (HIAO5)**

November 27, 1996

- 0. 0 INDEX/TABLE OF CONTENTS
- 1. 0 REMEDIAL INVESTIGATION/FEASIBILITY STUDY
  - 1. 1 See Harbor Island Sediments AR Section 1.0
  - 1. 2 Technical Memoranda
- 2. 0 PUBLIC PARTICIPATION
  - 2. 1 Proposed Plan
  - 2. 2 Public Comments
  - 2. 3 Public Hearing Proceedings
- 3. 0 ENFORCEMENT
  - 3. 1 Administrative Order on Consent
- 4. 0 RECORD OF DECISION
  - 4. 1 State Concurrence Letter
  - 4. 2 Record of Decision

HEADING: 1. 0. . . REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SUB-HEAD: 1. 1. . . Vol. 1 - See Harbor Island Sediments AR Section 1.0

SUB-HEAD: 1. 2. . . Vol. 1 - Technical Memoranda

1. 2. . . Vol. 1 - 1050687 DOC ID: 48887  
DATE: 11/3/95 PAGES: 50

AUTHOR(S):  
WESTON DESIGNER/CONSULTANTS

ADDRESSEE(S):  
Unknown Unknown/EPA

DESCRIPTION: TECHNICAL MEMORANDUM, HARBOR ISLAND REVISED SEDIMENT REMEDIAL  
ALTERNATIVES.

1. 2. . . Vol. 1 - 1050691 DOC ID: 67321  
DATE: 11/13/96 PAGES: 7

AUTHOR(S):  
WILLIAM J. ENKEBOLL/Landau Associates, Inc.  
Dennis R. Stettler/Landau Associates, Inc.

ADDRESSEE(S):  
Roland H. Webb/Todd Pacific Shipyards Corp.  
Roland H. Webb/Todd Pacific Shipyards Corp.

DESCRIPTION: TECHNICAL MEMORANDUM REGARDING CONCEPTUAL EVALUATION OF NEARSHORE  
FILL ALTERNATIVE, TODD SHIPYARDS.

(HIAO5) HARBOR ISLAND - Shipyard Sediments Administrative Record INDEX

HEADING: 2. 0. . . PUBLIC PARTICIPATION

SUB-HEAD: 2. 1. . . Vol. 1 - Proposed Plan

2. 1. . . Vol. 1 - 1050690 DOC ID: 67307

DATE: 10/31/95 PAGES: 14

AUTHOR(S):

EPA

ADDRESSEE(S):

Unknown

DESCRIPTION: PROPOSED PLAN, SHIPYARD SEDIMENTS OPERABLE UNIT, HARBOR ISLAND, SEATTLE, WA.

SUB-HEAD: 2. 2. . . Vol. 1 - Public Comments

2. 2. . . Vol. 1 - 1050692 DOC ID: 67322

DATE: 11/8/95 PAGES: 2

AUTHOR(S):

Richard J. Brooks/Brooks Rand, Ltd.

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER REGARDING HARBOR ISLAND SEDIMENT CLEAN-UP, FOCUSING ON MERCURY LEVELS.

2. 2. . . Vol. 1 - 1050693 DOC ID: 67323

DATE: 12/18/95 PAGES: 24

AUTHOR(S):

James J. Valenti/United Steelworkers of America

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER SUBMITTING COMMENTS ON THE PROPOSED PLAN FOR REMEDIAL ACTION, HARBOR ISLAND, SHIPYARD SEDIMENTS OPERABLE UNIT.

2. 2. . . Vol. 1 - 1050694 DOC ID: 67324

DATE: 12/21/95 PAGES: 85

AUTHOR(S):

R N. HELGERSON/LOCKHEED CORPORATION

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER SUBMITTING COMMENTS ON THE PROPOSED PLAN FOR REMEDIAL ACTION, HARBOR ISLAND, SHIPYARD SEDIMENTS OPERABLE UNIT EXPRESSING TWO FUNDAMENTAL CONCERNS WITH EPA'S PROPOSED PLAN.

2. 2. . . Vol. 1 - 1050695 DOC ID: 67325

DATE: 12/27/95 PAGES: 56

AUTHOR(S):

Alan B. Jones/Brooks Rand, Ltd.

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER REGARDING ADDITIONAL SEDIMENT MERCURY ANALYSIS AT HARBOR ISLAND SEDIMENT OPERABLE UNIT.

2. 2. . . Vol. 1 - 1050696 DOC ID: 67326

DATE: 12/28/95 PAGES: 7

AUTHOR(S):

Francis P. Sweeney/Washington State Department of Natural Resources

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER TRANSMITTING WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES' COMMENTS ON THE PROPOSED PLAN FOR THE SHIPYARD SEDIMENTS OPERABLE UNIT.

2. 2. . . Vol. 1 - 1050697 DOC ID: 67327

DATE: 1/2/96 PAGES: 3

AUTHOR(S):

James J. Valenti/United Steelworkers of America

ADDRESSEE(S):

Keith A. Rose/EPA

DESCRIPTION: LETTER TRANSMITTING COMMENTS ON THE PROPOSED PLAN FOR REMEDIAL ACTION, SHIPYARD SEDIMENTS OPERABLE UNIT.

(HIAO5) HARBOR ISLAND - Shipyard Sediments Administrative Record INDEX

2. 2. . . . Vol. 1 - 1050698 DOC ID: 67328  
DATE: 1/ 8/96 PAGES: 24

AUTHOR(S):  
Charles R. Blumenfeld/Bogle & Gates  
Leonard H. Sorrin/Bogle & Gates

ADDRESSEE(S):  
Keith A. Rose/EPA  
Keith A. Rose/EPA

DESCRIPTION: LETTER REGARDING COMMENTS ON THE SHIPYARD SEDIMENTS OPERABLE UNIT  
PROPOSED PLAN.

2. 2. . . . Vol. 1 - 1050699 DOC ID: 67329  
DATE: 1/ 8/96 PAGES: 1

AUTHOR(S):  
Margaret Duncan/Suquamish Tribe

ADDRESSEE(S):  
Keith A. Rose/EPA

DESCRIPTION: LETTER REGARDING EPA'S PREFERRED ALTERNATIVE FOR THE SHIPYARD SEDIMENTS  
OPERABLE UNIT.

2. 2. . . . Vol. 1 - 1050700 DOC ID: 67330  
DATE: 1/30/96 PAGES: 2

AUTHOR(S):  
James J. Valentí/United Steelworkers of America

ADDRESSEE(S):  
Keith A. Rose/EPA

DESCRIPTION: LETTER SUPPLEMENTING PREVIOUS COMMENT ON THE HARBOR ISLAND SUPERFUND  
SITE DATED 12/18/95 WITH SOME ADDITIONAL INFORMATION RECENTLY LOCATED.

SUB-HEAD: 2. 3. . . . Vol. 1 - Public Hearing Proceedings

2. 3. . . . Vol. 1 - 1050688 DOC ID: 67306  
DATE: 12/ 6/95 PAGES: 17

AUTHOR(S):  
Clint D. Hutchison/Bayside Reporters

ADDRESSEE(S):  
Unknown

DESCRIPTION: PROCEEDINGS, PUBLIC HEARING, ENVIRONMENTAL PROTECTION AGENCY, HARBOR  
ISLAND SUPERFUND SITE.

(HIAO5) HARBOR ISLAND - Shipyard Sediments Administrative Record INDEX

HEADING: 3. 0. . . . ENFORCEMENT

SUB-HEAD: 3. 1. . . . Vol. 1 - Administrative Order on Consent

3. 1. . . . Vol. 1 - 0001 DOC ID: 67308  
DATE: 2/13/95 PAGES: 40

AUTHOR(S): Unknown Unknown/EPA ADDRESSEE(S):  
Unknown

DESCRIPTION: ADMINISTRATIVE ORDER ON CONSENT FOR ADDITIONAL SAMPLING AND ANALYSIS FOR  
SEDIMENT OPERABLE UNIT.

This document is included by reference only. The actual document is located in the Harbor Island  
Sediments Administrative Record section 4.1.

(HIAO5) HARBOR ISLAND - Shipyard Sediments Administrative Record INDEX

HEADING: 4. 0. . . RECORD OF DECISION

SUB-HEAD: 4. 1. . . Vol. 1 - State Concurrence Letter

4. 1. . . Vol. 1 - 1050707 DOC ID: 67334

DATE: 11/26/96 PAGES: 1

AUTHOR(S):

Mary E. Burg/Washington Dept. of Ecology

ADDRESSEE(S):

Michael F. Gearheard/EPA

DESCRIPTION: CONCURRENCE TO THE REVISED HARBOR ISLAND SHIPYARD SEDIMENT RECORD OF DECISION.

SUB-HEAD: 4. 2. . . Vol. 1 - Record of Decision

4. 2. . . Vol. 1 -

DOC ID: 67335

DATE: PAGES: 100

AUTHOR(S):

ADDRESSEE(S):

DESCRIPTION: HARBOR ISLAND SHIPYARD SEDIMENT RECORD OF DECISION. [This entry will be edited when the document is received]

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
TO THE HARBOR ISLAND –  
SHIPYARD SEDIMENT OPERABLE UNIT  
TODD SHIPYARD SEDIMENTS  
SEATTLE, WASHINGTON**

**SELECTED REMEDIAL ACTION**

**I. Introduction**

**A. Purpose**

The purposes of this Explanation of Significant Differences (ESD) are: (1) to further define the selected remedial action for the under-pier areas; (2) to establish confirmational numbers characteristic of contamination present in the West Waterway for the purpose of defining the Todd Shipyard Sediments Operable Unit (TSSOU) boundary; (3) to adjust the TSSOU boundary based on the use of confirmational numbers; (4) to summarize the long-term monitoring, maintenance and operational requirements for TSSOU, (5) to define "predominately abrasive grit blast (AGB), and (6) to identify the disposal option.

**B. Site Name and Location**

The TSSOU consists of contaminated nearshore sediments within and adjacent to the Todd Shipyard on Harbor Island (Figure 1). Harbor Island is located approximately one mile southwest of downtown Seattle, in King County, Washington, and lies at the mouth of the Duwamish River on the southern edge of Elliott Bay (Figure 2). The island is manmade, approximately 430 acres in size, and used for industrial purposes. Todd Shipyard is located at the northwest corner of Harbor Island and faces Elliott Bay to the north and the West Waterway of the Duwamish River to the west.

**C. Lead and Support Agencies**

U.S. Environmental Protection Agency (EPA) – Lead Agency for sediment remediation.

State of Washington, Department of Ecology – Support Agency for sediment remediation.

#### **D. Statutory Authorities for the Explanation of Significant Differences (ESD)**

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP), authorize changes to the selected remedial action after issuance of a ROD. This ESD documents refinements to the selected remedial action for the Todd Shipyard Sediment Operable Unit.

#### **E. Administrative Record**

This ESD, a previous ESD issued in December, 1999, the Record of Decision, the Conceptual Design Report, Preliminary Design Report, various technical memoranda presenting geotechnical characterizations and a marine structures survey, as well as sediment chemical and biological testing results, and other reports and information related to the TSSOU are part of the administrative record. The administrative record is available for public review at the following location:

Environmental Protection Agency  
1200 Sixth Avenue, 7<sup>th</sup> floor  
Seattle, Washington  
(206) 553-4494

## **II. Summary of Site History, Nature and Extent of Contamination and Selected Remedy**

Harbor Island and the surrounding estuarine environment are highly industrialized. Prior to 1905, the area consisted of tideflats with a few piling-supported structures (mainly railroad trestles). The island was created between 1903 and 1905 with dredged material from the construction of the East and West Waterways and the main navigational channel of the Duwamish River. Since construction, the island has been used for commercial and industrial activities.

Todd Shipyards initiated shipbuilding activities on the island in 1916. Todd Shipyards is currently a ship repair, construction, and conversion facility that services approximately 275 vessels a year, including Navy vessels, Coast Guard vessels, passenger ferries, barges, fishing vessels, cruise ships, tank vessels and tug boats. The shipyard operates three drydocks at Piers 4, 5, and 6 for vessel repair and maintenance. A west sloping building berth is located on the West Waterway of the Duwamish River at Piers 1A and 1 for construction and launching of new vessels. Moorage berths are located along Piers 1, 2, 3, 4, 5, and 6. The existing facilities at Todd Shipyards include bulkheads, riprap protection of buttress fill slopes, pile-supported piers, floating

drydocks, a pile-supported building berth, a pile supported side launching way, and miscellaneous access ramps.

Harbor Island was listed by EPA as a Superfund site in 1983. EPA issued the ROD in November 1996, for the remediation of contaminated sediments adjacent to both the Todd and the former Lockheed Shipyards. EPA determined that cleanup actions were necessary because of unacceptable risks to benthic organisms and to subsistence fishers.

The ROD states: (1) all sediment exceeding the chemical contaminant screening level (CSL) of the State of Washington Sediment Management Standards (SMS) and shipyard waste be dredged and disposed of in an appropriate in-water or upland disposal facility, (2) all sediments exceeding the sediment quality standards (SQS) of the SMS be capped with a minimum of 2 feet of clean sediment, (3) specification of design criteria for acceptable habitat and to prevent future recontamination; and (4) institution of long-term monitoring and maintenance of the remedy. Additionally, the ROD notes that "(t)he extent of dredging of contaminated sediments and waste under piers at .... Todd Shipyard will be determined during remedial design based on cost, benefit and technical feasibility."

The TSSOU was established because TSSOU "sediments are distinct from other contaminated sediments at Harbor Island ... they are predominately contaminated with hazardous substances and shipyard wastes (primarily sandblast grit) released by shipbuilding and maintenance operations at Todd (and Lockheed) Shipyards" (see ROD, Section E. Scope and Role of Response Action Within the Remedial Strategy). Hazardous substances released from these shipyards include arsenic, copper, lead, mercury, tributyltin (TBT), and zinc, which were additives to marine paints used on ships. Other hazardous substances potentially associated with shipyard activities include polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs).

### **III. Description of and Basis for the Significant Differences**

#### **A. Introduction**

Subsequent to the ROD, pre-remedial design studies for the Todd Shipyard Sediment Operable Unit have better defined the nature and extent of contamination. This sediment characterization has been further used by EPA to determine the most technically feasible, cost-effective approach for implementing the dredge and cap remedy. During this pre-remedial design phase EPA has also developed definitions for "shipyard waste," including definitions for AGB and shipyard debris.

This ESD documents the following for the Todd Shipyard Sediment Operable Unit:

- (1) defines the selected remedial action for the under-pier areas;
- (2) establishes confirmational numbers characteristic of contamination present in the West Waterway for the purpose of defining the TSSOU boundary;
- (3) adjusts the TSSOU boundary based on the use of confirmational numbers;
- (4) summarizes the long-term monitoring, maintenance and operational parameters for TSSOU;
- (5) defines "predominately abrasive grit blast" (AGB), and
- (6) identifies the disposal option for contaminated sediments dredged from the TSSOU.

## **B. EPA Proposed Remedial Action for the Under-pier Areas**

The ROD notes that "(t)he extent of dredging of contaminated sediments and waste under piers at .... Todd Shipyard will be determined during remedial design based on cost, benefit and technical feasibility." In accordance with that ROD requirement that additional information be obtained to further define the under-pier remedy, Todd collected, analyzed and reported information in the Conceptual Design Report, Preliminary Design Report and various data remedial investigation documents and technical memorandums. Refer to the Key Documents at the end of the ESD for a listing of documents used by EPA to define the under-pier remedy.

The remedy for the under-pier areas is as follows:

### **1. Under Piers 2 and 4S**

- Demolish Pier 2 and 4S.
- For Pier 2, pull all piles. If a pile can not be pulled, the pile should be broken or cut off below the future mudline.
- For Pier 4S, pull piles, to the extent possible, without compromising slope stability. If a pile can not be pulled, the pile should be broken or cut off below the future mudline.
- Dredge contaminated sediments to the SQS.

## **2. Under Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth**

- In under-pier areas where remediation is required, apply granular material to an average overall thickness of at least one foot<sup>1</sup>. Areas of under-pier riprap that contain minimal or no visible sediment do not require remediation.
- Placement of granular material will extend beyond the boundary of the piers to include the "no dredge zone".
- Contaminated sediments in the under- pier areas of Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth will be dredged, after pier demolition, when the existing pier structures reach the end of their serviceable life.

## **3. Under Piers 4N and 5**

- In under-pier areas where remediation is required, apply granular material to an average overall thickness of at least 3 feet. Areas of under-pier riprap that contain minimal or no visible sediment do not require remediation.
- Placement of granular material will extend beyond the boundary of the piers to include the "no dredge zone".
- Contaminated sediments in the under- pier areas of Piers 4N and 5 will be dredged, after pier demolition, when the existing pier structures reach the end of their serviceable life.

Specifications for the grain size distribution of granular materials to be used for capping purposes will be determined in final design. Goals for material specification will include consistency of placement, protectiveness, stability and habitat benefit.

## **C. Confirmational Numbers**

Confirmational numbers have been defined as those concentrations that EPA has determined to be characteristic of contamination present in the adjacent West Waterway. These confirmational numbers have been used to assist EPA in defining the TSSOU remediation; and could also be used in determining potential future recontamination.

---

<sup>1</sup> Note that the one foot of granular material could change to a thickness greater than one foot if further design engineering analysis indicate that a layer of granular material greater than one foot can be placed under Piers 1, 1A, 2P, 3, 6, 6P and the Building Berth without causing pier structural problems.

To enable dredging of the TSSOU, it may be necessary for newly exposed surfaces to be created outside the TSSOU for purposes of meeting existing grades. If such newly exposed surfaces are created outside the TSSOU, Todd may sample the newly exposed surface to determine compliance with the confirmational numbers and undertake additional remedial action as deemed appropriate by EPA, or Todd may place a one-foot layer of sand on the newly exposed surface in lieu of sampling along the newly exposed surfaces.

<b>Confirmational Numbers by Chemical of Concern</b>			
<b>Contaminant</b>	<b>SQS (mg/kg)</b>	<b>CSL (mg/kg)</b>	<b>Confirmational Number</b>
Arsenic	57 dw	93 dw	93 (mg/kg) dw
Copper	390 dw	390 dw	390 (mg/kg) dw
Lead	450 dw	530 dw	530 (mg/kg) dw
Zinc	410 dw	960 dw	960 (mg/kg) dw
LPAHs*	370 toc	780 toc	780 (mg/kg) toc 13 mg/kg dw
HPAHs**	960 toc	5300 toc	5300 (mg/kg) toc 69 mg/kg dw
<b>For Bioaccumulants</b>			
PCBs	12 toc	65 toc	39 (mg/kg) toc 591 ug/kg dw
Tributyltin	not available	not available	76 (mg/kg) toc 1335 ug/kg dw
Mercury	0.41 dw	0.59 dw	1.34 (mg/kg) dw

d.w. = dry weight

toc = total organic carbon normalized

\* low molecular weight polynuclear aromatic hydrocarbons

\*\* high molecular weight polynuclear aromatic hydrocarbons

Given the coarse-grained characteristics of some of the TSSOU sediments, EPA will retain use of the DW TBT confirmational number as well as the total organic carbon (TOC) normalized value. Where the TOC is less than 1 percent, the dry weight criterion will be used; otherwise the TOC-normalized version will apply.

#### **D. Adjustments to the TSSOU**

The TSSOU is adjusted to include two additional areas, as shown on Figure 1. These areas encompass sample point HI-NS-09 to the north, and sample points

TS-P2-22-S and TS-043 to the west. Based on review of available data, EPA has concluded that all contamination associated with the TSSOU is included within the adjusted boundary which includes any newly exposed surfaces created as a result of dredging in the TSSOU. This determination by EPA is not intended to release Todd Pacific Shipyards from whatever liability it may have in the adjacent West Waterway Operable Unit.

#### **E. Long-term Operational, Maintenance, and Monitoring Parameters**

A Long-Term Operational, Maintenance and Monitoring Plan (OMMP) will be submitted with the 95% Remedial Design for the TSSOU. The following will be addressed in detail in the OMMP:

- erosion monitoring by survey, video or other means of the under-pier granular materials, with contingencies for maintenance of the cap materials and potential sampling for chemicals of concern (COCs) in areas adjacent to the piers if erosion of cap materials has occurred;
- monitoring of stormwater source control actions through documentation of compliance with NPDES requirements, and monitoring of potential NPDES system overflows for both NPDES and sediment chemicals of concern (COCs);
- monitoring of dry dock grit management source control actions through documentation of compliance with NPDES requirements.
- EPA may require monitoring of the open water areas to be conducted as part of Five Year Reviews. If chemical monitoring for COCs is performed in open water areas along the outer areas of the TSSOU, results will be compared to the confirmational numbers listed in section C-E above to determine whether recontamination has occurred at levels of concern.

All monitoring activities will be subject to EPA's review, approval, oversight and reporting requirements.

#### **F. Definition for Shipyard Waste, Abrasive Grit Blast and Shipyard Debris.**

The following definitions for shipyard waste, AGB and shipyard debris are proposed below. The definition for AGB consists of a physical and a chemical component which when combined are a "signature" for AGB. Based on activities associated with shipyards, field observations, seabed characterization work (including bathymetry and sidescan sonar) and other site investigation data, EPA proposes that shipyard waste be defined as consisting of 1 or 2:

## **1. Abrasive Grit Blast (AGB)**

Identification of AGB may be made by one of two means: visible evidence, or chemical and physical evidence. Visual identification alone is sufficient to identify AGB (see a. below). The second means (see b. below) of identification is a combination of chemical and physical evidence. The criteria for determining AGB are:

a. Visual identification: EPA and Todd agree that the material is predominantly AGB.

OR

b. Chemical and physical evidence: Data indicating that the grain size of the material is greater than (or equal to) 50 percent coarse material typically associated with spent grit blast (i.e., 0.15 to 2.0 mm in size);

AND AT LEAST TWO OF THE FOLLOWING:

- i. Copper concentration greater than the chemical screening level (CSL) of 390 mg/kg;
- ii. Zinc concentration greater than the CSL of 960 mg/kg;
- iii. Arsenic concentration greater than the CSL of 93 mg/kg.

## **2. Shipyard Debris and Other Shipyard Waste**

Wood, concrete, sheet steel, steel cables, tires, welding rods, and various other debris or shipyard waste that will impede dredging activities or compromise the integrity of the cap.

The above AGB definition is a generic definition developed solely for the TSSOU. All AGB will be removed from the TSSOU as part of the remedy, to the extent practicable.

## **G. Disposal of Dredged Sediments**

The ROD stated that dredged sediments must be disposed in "appropriate confined nearshore disposal (CND) or confined aquatic disposal (CAD) facilities." The ROD further stated that the appropriate CND or CAD facilities would be selected in remedial design and if a suitable site could not be found, dredged sediments must be taken to an appropriate upland disposal facility. Analysis of disposal options during remedial design, based on the ROD criteria, identified upland disposal facilities as the appropriate disposal option for dredged TSSOU sediments.

#### **IV. Support Agency Comments**

The Washington Department of Ecology participated in the review of the new information that led to the preparation of this ESD, and concurs with this modification to the remedy for the Todd Shipyard Sediment Operable Unit. Ecology recognizes that EPA will conduct five year reviews for the Harbor Island Site. The primary purpose of a five year review is to determine whether the selected remedy continues to be protective of human health and the environment. The five year reviews will include the Soil and Groundwater Operable Unit, the two Shipyard Operable Units and the West Waterway Operable Unit. Ecology will have an opportunity to participate in the five year review. Among the issues that will be evaluated for the Shipyard Operable Units will be the contaminants remaining above the State Sediment Management Standards.

#### **V. Affirmation of Statutory Determinations**

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA believes that the remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD as applicable or relevant and appropriate to this remedial action, and is cost-effective. The remedy continues to utilize permanent solutions and alternative treatment technologies to the maximum extent possible. This ESD is consistent with the requirements and considerations for remediation established in the ROD.

#### **VI. Public Participation Activities**

A public notice will be placed in a local newspaper announcing the availability of the ESD to the public. The Administrative Record, located at the information repository listed in section E of this ESD, contains the ESD and supporting documentation. A listing of the Administrative Record documents is attached to this ESD.

  
Michael F. Gearheard  
Director, Office of Environmental Cleanup

3/31/03  
Date

## **Administrative Record Index**

(HUPAR) HARBOR ISLAND - TODD SHIPYARD UNDER PIER REMEDY ESD INDEX

HEADING: 0. 0. . . INDEX/TABLE OF CONTENTS

(HUPAR) HARBOR ISLAND - TODD SHIPYARD UNDER PIER REMEDY ESD INDEX

EVS Environment Consultants

Lockheed Martin Corp.

DESCRIPTION:

Waterway Sediment Operable Unit: Tributyltin (TBT) in Marine Sediments and the Bioaccumulation of TBT Combined Data Report.

This document is included by reference only. A copy can be found in folder 1.11.2 of the West Waterway Sediments Administrative Record (HIAO4).

1. 4. . . . Vol. 1 - 1088125      DOC ID: 1088125  
DATE: 9/1/1999      PAGES: 14

AUTHOR(S):  
Environmental Solutions Group

ADDRESSEE(S):  
Unknown

EPA

DESCRIPTION:

Technical Memorandum: Topics Related to the Tributyltin (TBT) Study at the Harbor Island Superfund Site, Waterway Sediment Operable Unit.

This document is included by reference only. A copy can be found in folder 1.11.2.1 of the West Waterway Sediments Administrative Record (HIAO4).

1. 4. . . . Vol. 1 - 1088127      DOC ID: 1088127  
DATE: 9/1/1999      PAGES: 198

AUTHOR(S):  
Environmental Solutions Group

ADDRESSEE(S):  
Lockheed Martin Corp.

Todd Pacific Shipyards Corp.

Port of Seattle

DESCRIPTION:

Assessing Human Health Risks from the Consumption of Seafood: Human Health Risk Assessment Report (Final).

This document is included by reference only. A copy can be found in folder 1.11.3 of the West Waterway Sediments Administrative Record (HIAO4).

(HUPAR) HARBOR ISLAND - TODD SHIPYARD UNDER PIER REMEDY ESD INDEX

**HEADING: 4. 0. . . RECORD OF DECISION**

**SUB-HEAD: 4. 1. . . Vol. 1 - State Concurrence Letter**

4. 1. . . Vol. 1 - DOC ID: 1160356  
DATE: 3/28/2003 PAGES: 2

AUTHOR(S): James J. Pendowski/Washington State Dept. of Ecology  
ADDRESSEE(S): Michael F. Gearheard/EPA

DESCRIPTION: Concurrence letter for the Explanation of Significant Differences (ESD) to the Harbor Island Shipyard Sediment Operable Unit, Todd Shipyard Sediments.

**SUB-HEAD: 4. 2. . . Vol. 1 - Record of Decision**

4. 2. . . Vol. 1 - 1050713 DOC ID: 1050713  
DATE: 11/27/1996 PAGES: 79

AUTHOR(S): Charles C. Clarke/EPA  
ADDRESSEE(S): Unknown

DESCRIPTION: Record of Decision, Declaration, Decision Summary, and Responsive Summary for the Shipyard Sediment Operable Unit, Harbor Island.

This document is included by reference only. A copy can be found in folder 4.2 of the Shipyard Sediments Administrative Record (HIAO5).

**SUB-HEAD: 4. 3. . . Vol. 1 - Explanation of Significant Differences**

4. 3. . . Vol. 1 - DOC ID: 1099952  
DATE: 12/27/1999 PAGES: 10

AUTHOR(S): EPA  
ADDRESSEE(S): Unknown

DESCRIPTION: Explanation of Significant Difference (ESD) to the Harbor Island-Todd Shipyards Portion of the Shipyard Sediments Operable Unit Record of Decision.

4. 3. . . Vol. 1 - DOC ID: 1160357  
DATE: 3/31/2003 PAGES: 13

AUTHOR(S): Michael F. Gearheard/EPA  
ADDRESSEE(S): Unknown

DESCRIPTION: Explanation of Significant Differences (ESD) to the Harbor Island - Shipyard Sediment Operable Unit, Todd Shipyard Sediments, Selected Remedial Action.

(HUPAR) HARBOR ISLAND - TODD SHIPYARD UNDER PIER REMEDY ESD INDEX

5. 5. 1. . . Vol. 1 - DOC ID: 1146600  
DATE: 1/18/2002 PAGES: 4

AUTHOR(S):  
Lynda E. Priddy/EPA

ADDRESSEE(S):  
Al Rainsberger/Todd Pacific Shipyards Corp.

DESCRIPTION: Letter transmitting EPA comments regarding the Draft Technical Memorandum, Habitat Evaluation, Todd Shipyards Sediment Operable Unit.

5. 5. 1. . . Vol. 1 - DOC ID: 1151571  
DATE: 11/15/2002 PAGES: 18

AUTHOR(S):  
Jane Fisher/Floyd Snider McCarthy, Inc.

ADDRESSEE(S):  
Lynda E. Priddy/EPA

Stephen Reimers/Floyd Snider McCarthy, Inc.

Kathryn Snider/Floyd Snider McCarthy, Inc.

DESCRIPTION: Memorandum transmitting additional abrasive grit blast evaluation results (Attachments: field logs, Analytical Resources Inc. laboratory reports and chain of custody, grain size analysis results and chain of custody).

5. 5. 1. . . Vol. 1 - DOC ID: 1151572  
DATE: 11/15/2002 PAGES: 175

AUTHOR(S):  
Jane Fisher/Floyd Snider McCarthy, Inc.

ADDRESSEE(S):  
Lynda E. Priddy/EPA

Kathryn Snider/Floyd Snider McCarthy, Inc.

Stephen Reimers/Floyd Snider McCarthy, Inc.

DESCRIPTION: Memorandum transmitting dredging elutriate testing results (Attachments: core logs; Analytical Resources Inc. laboratory reports, chain of custody and data validation; grain size analysis results and chain of custody).

SUB-HEAD: 5. 6. . . Vol. 1 - Design Reports

5. 6. . . Vol. 1 - 1099885 DOC ID: 1099885  
DATE: 1/11/1999 PAGES: 500

AUTHOR(S):  
Landau Associates, Inc.

ADDRESSEE(S):  
EPA

Todd Pacific Shipyards Corp.

DESCRIPTION: Final Report: Remedial Design Sampling and Analysis Results, Todd Shipyards Portion of the Shipyard Sediment Operable Unit.

(HUPAR) HARBOR ISLAND - TODD SHIPYARD UNDER PIER REMEDY ESD INDEX

Floyd Snider McCarthy, Inc.

Todd Pacific Shipyards Corp.

**DESCRIPTION:** Conceptual Design Report, Agency Review Draft (Attached: 7/12/02 transmittal letter addressed to the EPA).

5. 6. . . . Vol. 2 -                      DOC ID: 1151575  
DATE: 12/5/2002                      PAGES: 218  
AUTHOR(S):  
Floyd Snider McCarthy, Inc.

ADDRESSEE(S):  
Todd Pacific Shipyards Corp.

**DESCRIPTION:** Preliminary Design Report (Attached: 12/5/02 transmittal letter addressed to the EPA).

5. 6. . . . Vol. 2 -                      DOC ID: 1160032  
DATE: 3/10/2003                      PAGES: 24  
AUTHOR(S):  
EPA

ADDRESSEE(S):  
Unknown

**DESCRIPTION:** Selection of Confirmational Chemical Criteria for use at the Harbor Island Superfund Site Shipyards Operable Unit (screening level tables and surface sediment maps attached).  
  
This document is included by reference only. A copy can be found in folder 5.6 of the Todd Shipyard Under Pier Remedy ESD (HUPAR)

**SUB-HEAD: 5. 6. 1. . . Vol. 1 - Comments and Responses**

5. 6. 1. . . Vol. 1 -                      DOC ID: 1151983  
DATE: 2/22/2002                      PAGES: 8  
AUTHOR(S):  
Lynda E. Priddy/EPA

ADDRESSEE(S):  
Al Rainsberger/Todd Pacific Shipyards Corp.

**DESCRIPTION:** Letter transmitting comments on the draft Technical Memorandum, Sediment Disposal Options Evaluation, Phase 2 Remedial Design Sampling and Analysis, Todd Shipyards Operable Unit dated 12/11/01.

5. 6. 1. . . Vol. 1 -                      DOC ID: 1151971  
DATE: 3/6/2002                      PAGES: 4  
AUTHOR(S):  
Lynda E. Priddy/EPA

ADDRESSEE(S):  
Al Rainsberger/Todd Pacific Shipyards Corp.

**DESCRIPTION:** Letter transmitting EPA comments regarding the Draft Technical Memorandum, Marine Structures Survey, Phase 2 Remedial Design dated 1/25/02.

5. 6. 1. . . Vol. 1 -                      DOC ID: 1151982  
DATE: 1/24/2003                      PAGES: 21  
AUTHOR(S):  
Lynda E. Priddy/EPA

ADDRESSEE(S):  
Al Rainsberger/Todd Pacific Shipyards Corp.

HEADING: 6. 0. . . REMEDIAL ACTION

SUB-HEAD: 6. 3. . . Vol. 1 - Remedial Action Selection Report

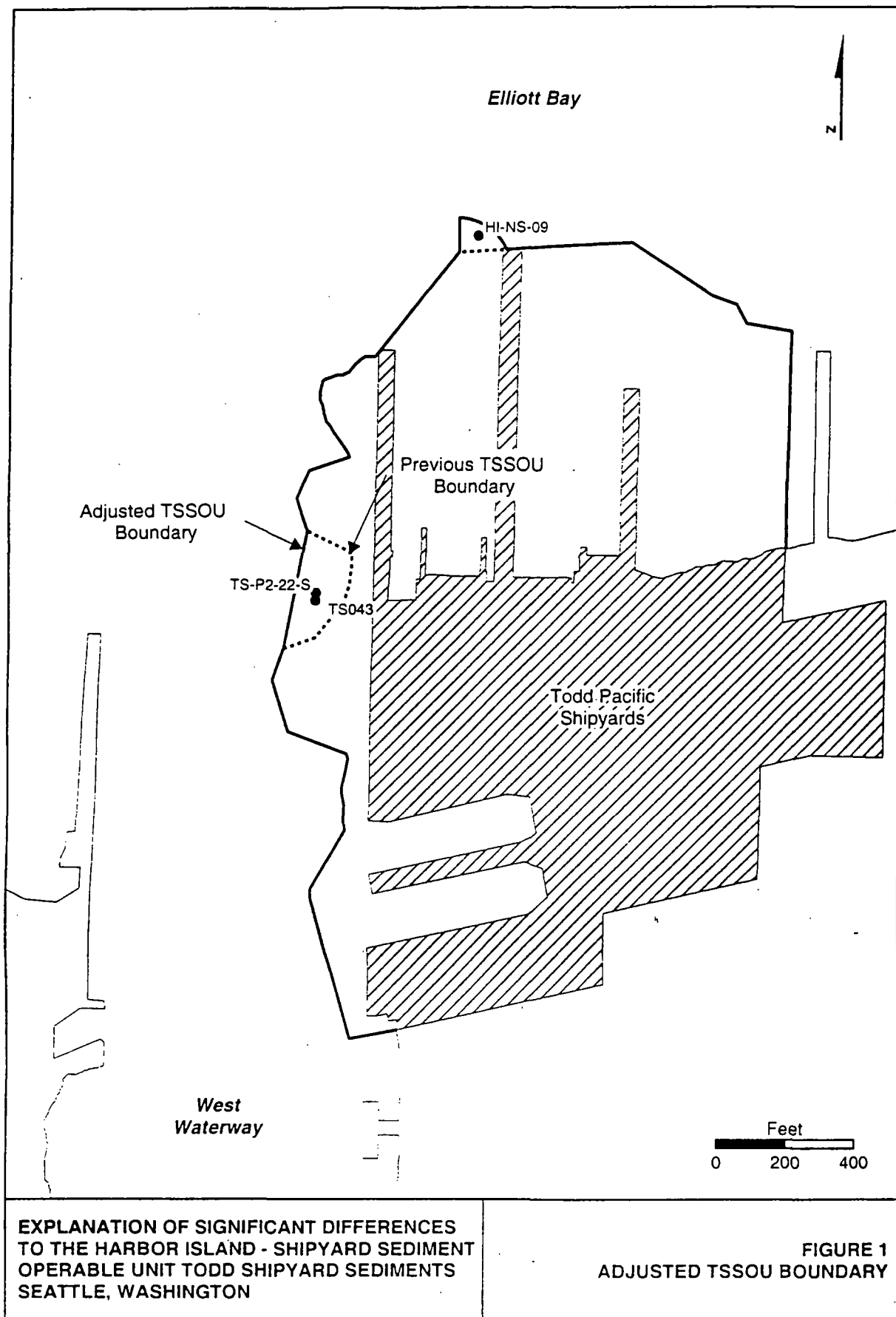
6. 3. . . Vol. 1 - DOC ID: 1151986

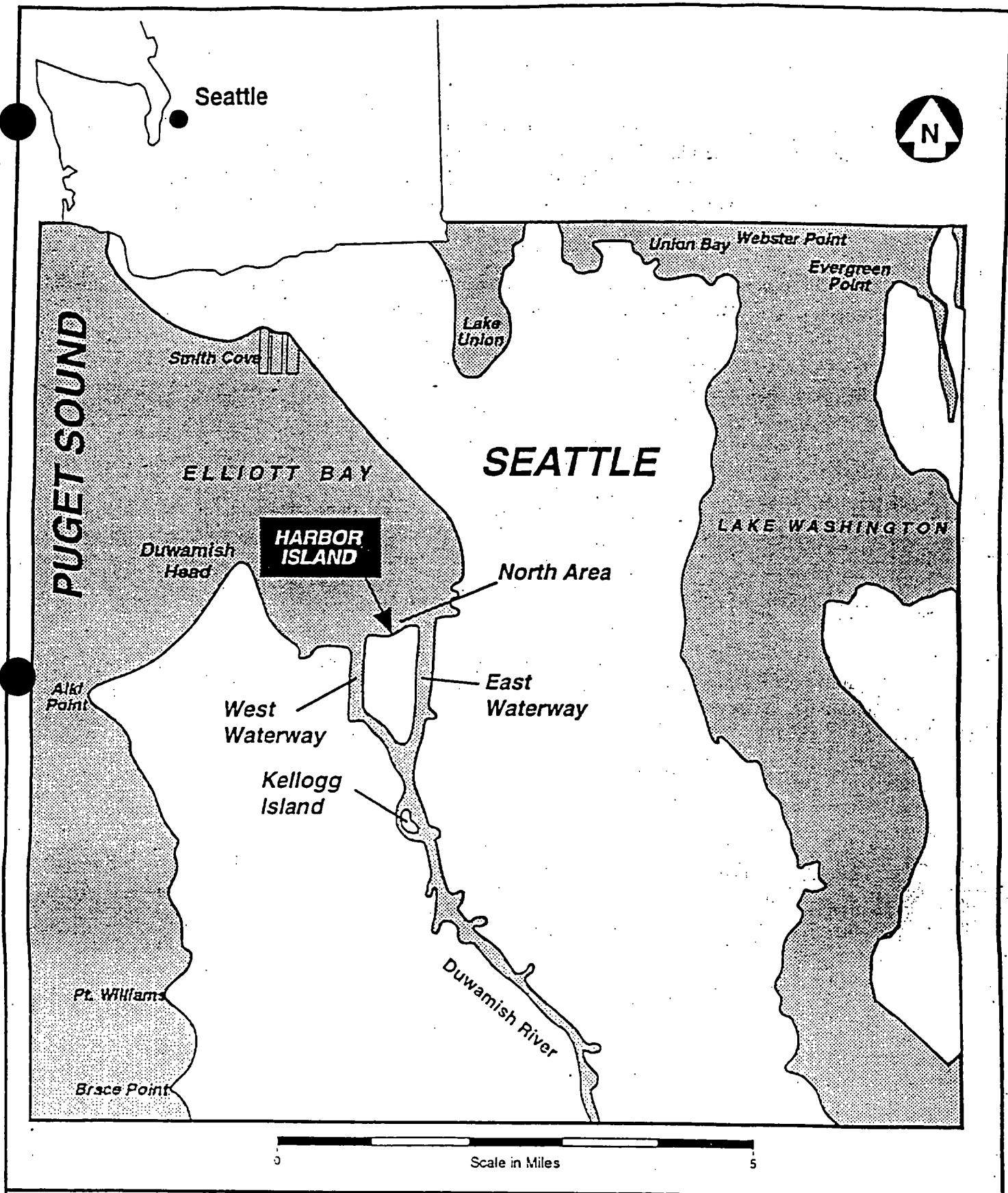
DATE: 3/3/2003 PAGES: 115

AUTHOR(S):  
Floyd Snider McCarthy, Inc.

ADDRESSEE(S):  
Todd Pacific Shipyards Corp.

DESCRIPTION: Remedial Action Selection for Under-Pier Sediments, Todd Shipyards Sediment Operable Unit.





ADAPTED FROM:



JCB NUMBER: 4000-02-46-2110 DATE: August 1994

## Vicinity Map

FIGURE

2

**EXPLANATION OF SIGNIFICANT DIFFERENCE  
TO THE HARBOR ISLAND – TODD SHIPYARDS PORTION OF THE SHIPYARD  
SEDIMENTS OPERABLE UNIT  
RECORD OF DECISION  
SEATTLE, WASHINGTON**

**A. Introduction**

1. Site name and location: Harbor Island–Shipyard Sediments Operable Unit (SSOU), Seattle, Washington. The Record of Decision for the SSOU identifies a cleanup remedy for sediments adjacent to Todd and Lockheed Martin No. 1 Shipyards. Subsequent remedial design activities address either the Todd or Lockheed Martin Shipyards which are now considered separate Operable Units (OUs). These cleanup areas are called the Todd Shipyard Sediment Operable Unit (TSSOU) and the Lockheed Shipyard Sediment Operable Unit (LSSOU). This Explanation of Significant Differences (ESD) addresses the contaminated sediments in the TSSOU.

Harbor Island is located at the mouth of the Duwamish River on the southern margin of Elliott Bay, approximately 1 mile southwest of downtown Seattle. Todd Shipyards is located at the northwest corner of Harbor Island and faces Elliott Bay to the north and the West Waterway of the Duwamish River to the west (see Figure 1).

2. Lead Agency: U. S. Environmental Protection Agency (EPA)
3. Support Agency: State of Washington, Department of Ecology (Ecology)
4. Legal authorities for the Explanation of Significant Differences (ESD): Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP), authorize changes to the selected remedial action after issuance of a Record of Decision (ROD). This ESD documents changes to the selected remedial action for the Todd Shipyard Sediments Operable Unit (TSSOU).
5. Administrative Record File: This ESD will become a part of the Administrative Record file (NCP §300.825(a)(2)) and is available to the public to review at the Records Center, 7<sup>th</sup> floor, 1200 Sixth Avenue, Seattle, Washington.
6. The purpose of the ESD is to designate the Todd Shipyards site as an independent operable unit identified as the Todd Shipyards Sediment Operable Unit (TSSOU) and to redefine the boundary of the TSSOU identified in the November 1996 ROD based on additional information gathered during two remedial design investigations associated with this OU.

chemical exceedences, identification of shipyard waste (i.e., abrasive grit blast and solid waste) and new bathymetric data. Sediment samples collected during the initial remedial design investigation indicated sediments on, or outside of, the -42 foot MLLW contour boundary exceeded the chemical or biological criteria in the Washington State Sediment Management Standards (SMS), exhibited properties of abrasive grit blast or solid waste, or exceeded a site-specific screening level for bioaccumulative chemicals of concern. Therefore, the present ROD-defined operable unit boundary does not encompass all of the potentially contaminated sediments requiring remediation.

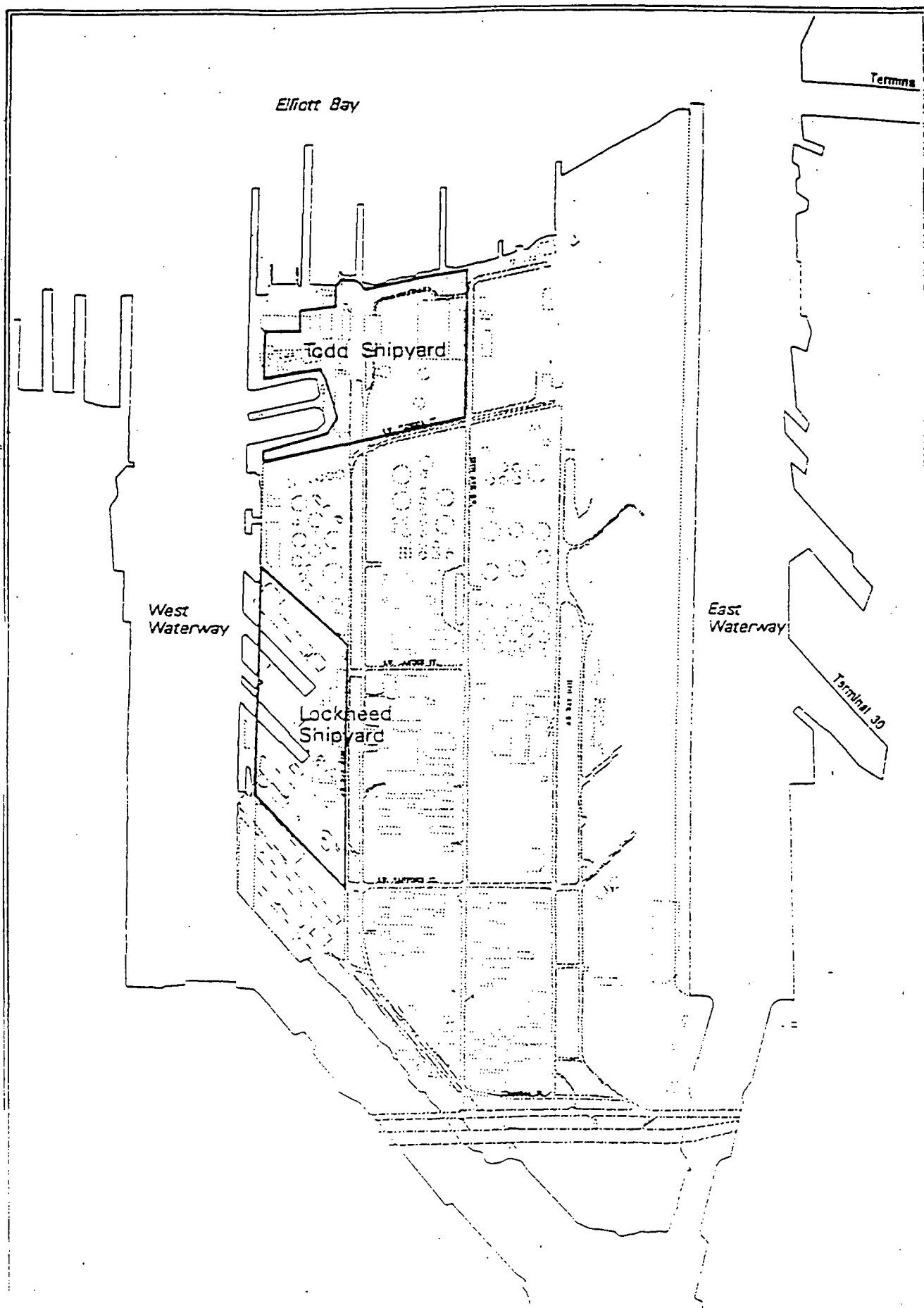
EPA's specific site boundary changes are based on sample results that met a minimum of two of the following criteria, or two elements of a criterion: (1) Todd Shipyards property boundaries and structures (e.g., TS039, TS048, TS049, Pier No. 5 and Dry Dock No. 2); (2) CSL or 2 Lowest Adverse Effects Threshold (LAET) exceedences for copper, zinc, or PAHs (any 2 of the 3 contaminants; e.g., TS048, TS049, and TS-RD-S16); (3) TBT or PCB screening level exceedences (any 2 of the 3 contaminants; e.g., TS042, TS048 and (4) evidence of abrasive grit blast (e.g., TS049, adjacent to a visual observation) or solid waste (e.g., TS041, TS044, and TS-RD-S16), identified from data collected by Evans-Hamilton on behalf of Todd Shipyards. The ROD boundary is therefore relocated in the following locations:

- The southern-most boundary should accurately reflect the upland property boundary extended into the West Waterway;
- The eastern boundary is expanded to include the area of the Todd Shipyards former sideslip shipway between Pier No. 6 and the Mobil Oil pier, and reflect the upland property boundary extended into Elliott Bay;
- The northern boundary is expanded to encompass all Todd Shipyard property/structures, i.e., to at the end of Dry Dock No. 2 and Pier No. 5;
- The western boundary is expanded in three areas to include Stations TS041, TS042 and TS-RD-S16, and thereby include all of the identified contaminated stations within the TSSOU. This new boundary is to be placed halfway between the contaminated station and the next clean station.

The new ROD boundary is identified in Figure 2.

- Public Participation Activities

The attached Fact Sheet was distributed to the Harbor Island mailing list of approximately 250 individuals. In addition, the Fact Sheet was made available for public review at the information repository listed on the back page of the Fact Sheet (see Attachment 1). Due to the degree of historical public interest at this site, EPA did not have a public comment period in conjunction with this ESD.



SCALE 1:1000  
0 10 20 30 40

Harbor Island Site Map

Figure 1

# **SUPERFUND**

## **Fact Sheet**

**HARBOR ISLAND**  
**Seattle, Washington**



U S ENVIRONMENTAL PROTECTION AGENCY REGION

December 1999

The U.S. Environmental Protection Agency (EPA) has expanded the boundaries of contaminated marine sediments around the Todd Shipyards facility and has designated the Todd Shipyard Sediment site as a distinct cleanup unit called the Todd Shipyard Sediment Operable Unit (TSSOU). This fact sheet describes those changes and provides an update on other Superfund activities taking place at the Harbor Island site.

### **Shipyard Sediments Unit**

In November 1996, EPA selected a cleanup plan at Todd and Lockheed Shipyards to dredge and dispose of the most contaminated sediments and place a clean sediment cap over any remaining contamination. Because these shipyards have distinct characteristics and different property owners, EPA is addressing Todd and Lockheed Shipyards sediments as separate cleanup units (see Figure 1).

Before cleanup design could begin, Todd Shipyards agreed to conduct additional sampling to identify sediment contamination exceeding state chemical criteria, conduct optional biological tests, and identify areas containing significant amounts of sandblast grit. The data show contamination outside the ROD boundary. As a result, EPA collected samples outside of the ROD boundary to determine the extent of the contaminated sediments. In addition, Todd Shipyards collected bathymetric data to determine the present contours and depths of the potential cleanup area, identified additional areas containing sandblast grit and shipyard debris and addressed other pre-design data gaps.

To address all of this new information, EPA is expanding and redefining the ROD boundary area at the TSSOU (see Figure 2). This change is outlined in a document called an Explanation of Significant Differences (ESD). A copy of the ESD and supporting documents are available at the EPA's office at 1200 Sixth Avenue in Seattle. If

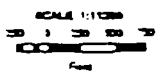
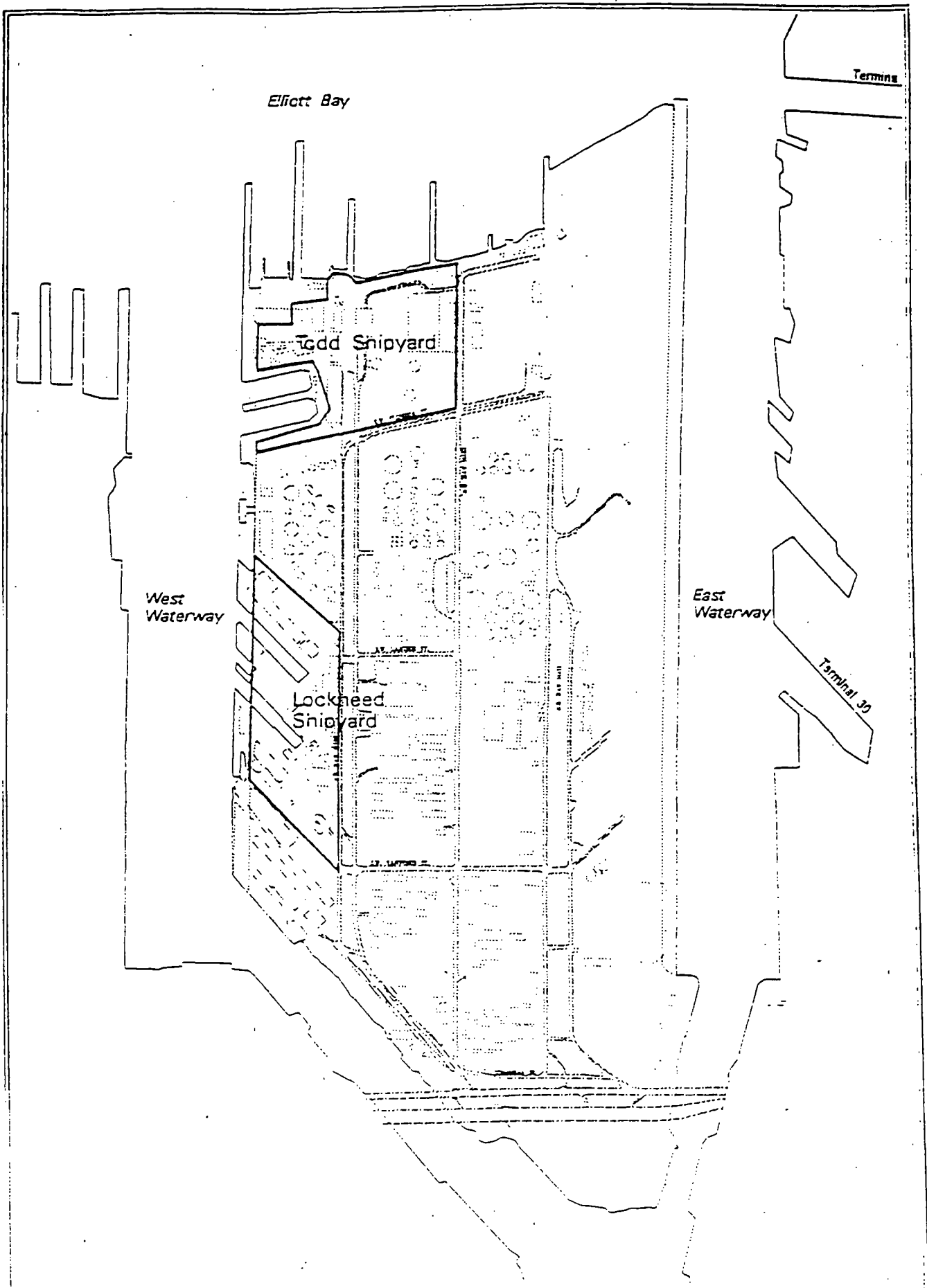
you would like to review the ESD, or any other document related to the site, please call the Records Center at (206) 553-4494 to arrange a time.

### **Background**

Harbor Island lies in an estuary at the mouth of the Duwamish River on the southern edge of Elliott Bay. The island was constructed between 1903 and 1905 from sediments dredged from the Duwamish River to create the East and West Waterways and the navigational channel of the upper Duwamish River. Since construction, the island has been used for ship building and maintenance, lead smelting, and other industrial activities.

Harbor Island was added to EPA's National Priorities List (NPL) in 1983 when hazardous substances were found in soils on the island and in sediments near the island. The NPL is a list of sites targeted for further investigation and possible cleanup under Superfund authority.

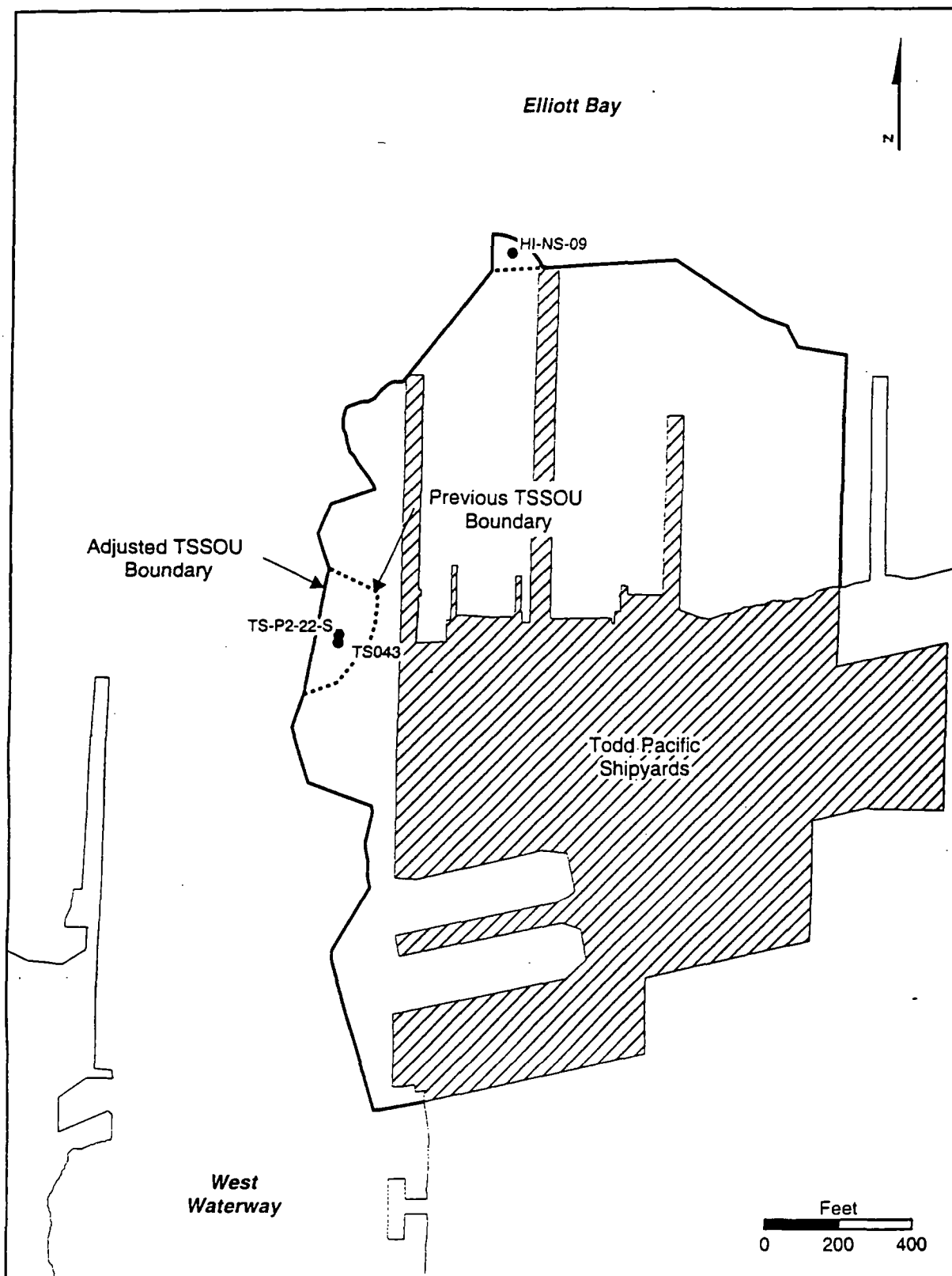
For investigation and cleanup purposes, EPA has divided the Site into many 'Operable Units'. The site includes an upland portion and a marine sediment portion, which are further divided into Operable Units. Additional operable units may be created as site activities progress. Currently, the Washington Department of Ecology is overseeing the work on one of the upland portions, called the Tank Farms.



Harbor Island Site Map

Figure 1

## APPENDIX C



EXPLANATION OF SIGNIFICANT DIFFERENCES  
TO THE HARBOR ISLAND - SHIPYARD SEDIMENT  
OPERABLE UNIT TODD SHIPYARD SEDIMENTS  
SEATTLE, WASHINGTON

FIGURE 1  
ADJUSTED TSSOU BOUNDARY